American Aviation

MAY 15, 1950 25c

THE AIR INDUSTRY'S PIONEER INDEPENDENT MAGAZINE

RECEIVED 17 MAY 1950 ARMY LIBRARY SERIAL RECORD

Thanks, Senator

AT LAST there is official recognition in high places that the *airlines* of the United States are *not* being subsidized by mail pay.

If there is any subsidy involved in air mail payments, the subsidy is on behalf of the communities and users of the air service.

by W. W. P.

No less than a report of a committee of the United States Senate puts this issue squarely on the record for the first time where it really counts.

Senator Edwin C. Johnson (D., Col.), chairman of the Senate Committee on Interstate and Foreign Commerce, has just made an interim report on the separation of air mail pay from subsidy.

"The subsidy 'need' is clearly not a subsidy to the airline, which is merely rendering a public service for a fair return," his report says, *"but goes to the passengers, shippers and air mail patrons of the communities the airline serves."*

So Senator Johnson proposes to charge up to the communities that don't pay their way the additional costs involved in the air service. That's beginning to call a spade a spade, to place the burden of cost responsibility where it belongs. It is refreshing, for once, to see a report that doesn't accuse the airlines of gorging themselves at the public trough.

Senator Johnson said that a careful reading of the testimony before his committee last year revealed that there was agreement in general that airlines carrying only long-haul business and servicing only a few high-density points could operate profitably without subsidy; or, to put it another way, that the certificate requirement compelling the airlines to serve a large number of small stations, or to carry predominantly short-haul traffic absorbed most of the profits earned in the long-haul high-density business and was the basic reason why subsidy was required.

This, he added later, if management economy and efficiency are attained, the subsidy rests squarely upon the community whose revenues are insufficient to pay the cost of airline service.

Senator Johnson is now proposing that "subsidy for domestic air transportation should be specifically identified and presented to Congress *on a community basis*" and he is recommending that legislation be passed by Congress directing the determination by

(Turn to page 8)

Heads Airport Operators Council

A. B. Curry, director, Dade County Port Authority, Miami, who was elected to the presidency of the Airport Operators Council at its annual meeting in Cleveland, April 24-26. Regarded as one of the ablest airport officials in the country, Mr. Curry has done an outstanding job as chairman of the Civil Aeronautics Administration's Airports Advisory Committee. (See story, page 19).

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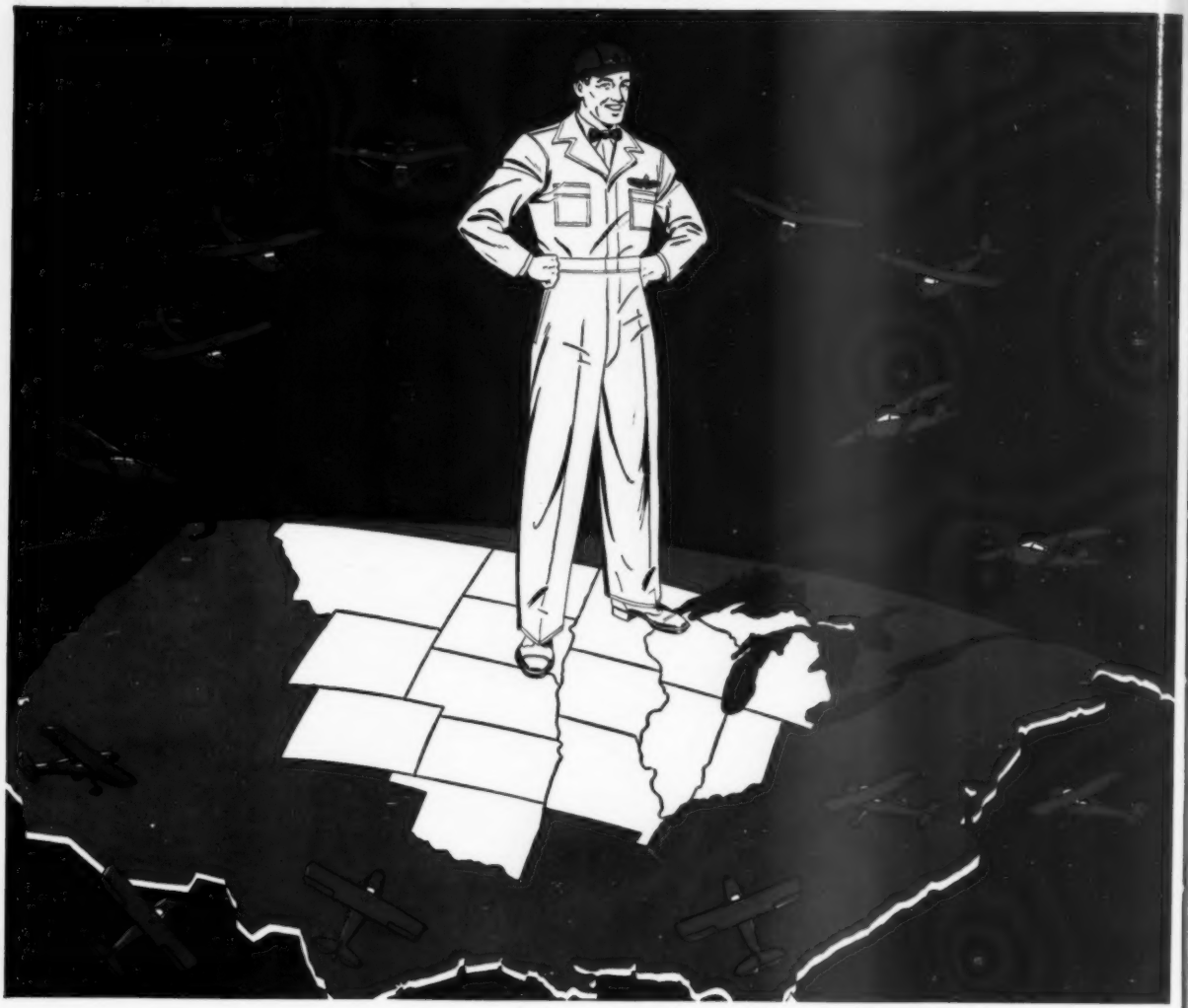

Right smack in the middle of the aviation picture

Located at the "crossroads of America," Standard Oil Company (Indiana) serves a territory which has more than one fourth of the nation's population. If you travel midwest airways, you have good reason to know how well Standard serves. For throughout fifteen midwest states, Standard Airport Dealers offer skilled service and products of top quality and uniformity.

High up on the list of these products is STANDARD 80/87-octane Aviation Gasoline, popular fuel for light craft, made expressly for this service. It is a clear, unleaded fuel that assures maximum power and smoothness of operation. Two other carefully formulated fuels—STANDARD 91/98- and 100/130-octane Aviation Gasolines—fulfill every need of the transport operator.

These reliable products of Standard Oil research are waiting for you at hundreds of Standard Airport Dealers wherever you fly in the Midwest.

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STANDARD Aviation Engine Oils
STANDARD Aviation Lubricants and Hydraulic Oils
QUAKER STATE Aero Engine Oils

STANDARD OIL COMPANY (INDIANA)

DELIVERY—

Via the Air Route

The Military Air Transport Service (MATS) contributes to the mobility of the Armed Forces by airlifting cargo and personnel *whenever* and *wherever* needed to fulfill national military requirements.

Fairchild C-119 Packets, soon to be flying for the Military Air Transport Service, help fulfill this vital air transportation mission. Capable of carrying 64 passengers or 10 tons of cargo, this twin-engine transport and cargo plane has the *versatility* to accomplish numerous types of operations required via the MATS Air Route.

The C-119's unique rear loading at truck-bed height allows for rapid handling of cargo, eliminating the necessity for extra ground handling equipment. Airplane engines and parts, bulky communication equipment, vehicles, tanks and field kitchens are some of the many military items the Fairchild C-119 carries with ease. In addition to its utility as a cargo plane, the Packet is equally efficient for air-evacuation, air-sea rescue, and personnel transport.

The C-119 is one of a series of Fairchild transport planes which will continue to play a versatile role in the operations of the world wide Military Air Transport Service.

Teamed for Defense
Armed Forces Day
20 March 1950

ENGINE AND AIRPLANE CORPORATION
FAIRCHILD *Aircraft Division*
HAGERSTOWN, MARYLAND

BACKGROUND & TRENDS

Vote of Confidence

Stockholders of Fairchild Engine and Airplane Corp. are **well satisfied with the new management** that took over last July after the proxy fight. They re-elected the board of directors last month with the greatest number of shares (1,559,861) voted in the company's history (with the exception of the number voted in the proxy fight). Also okayed, with 94% in favor, was $127,000 reimbursement to members of the stockholders' committee who financed the proxy controversy.

Competition on the Merry-Go-Round

Eastern Air Lines expects to be in a **better competitive position** in the Washington-New York market now that it's removed the extra fare from Constellation equipment. It had been operating extra-fare Constellations alongside American's standard-fare DC-6's and Convairs. EAL has now put three Constellations into the merry-go-round service. American, meanwhile, has upped its trips between the cities to 24 daily.

Bonanza Sales Up

Bright spot in the **personal and executive plane picture** is the report that the production rate for the four-place Beech Bonanza has increased twice since the first of the year and that the current production schedule of 10 ships a week is already sold out through mid-July. Bonanza sales in the first quarter of 1950 were 172% of total sales quota. Latest industry report on shipments of one to 10-place planes is for March, which was 16% under same month last year.

Transport Tax Cut

Airline passengers will save about $16 million a year through the **5% reduction in the 15% transportation tax,** voted by the House Ways and Means Committee, which also cut in half the 3% tax on freight. Although the cut may stimulate some travel, it won't cut airline expenses. Some lines estimate it costs them about 1% of total revenues to collect the tax, and a reduction doesn't decrease this expense. Efforts may be made in the Senate to cut the tax further, but prospects aren't too good because the government's fiscal 1951 deficit may be a billion dollars higher than estimated by President Truman earlier this year.

Corporation for Government Airports

Civil Aeronautics Administration is studying the advisability of **establishing a government corporation** to operate the three U. S.-owned airports—National Airport at Washington, and the fields at Fairbanks and Anchorage, Alaska. Rep. Karl Stefan (R., Neb.), ranking Republican member on the House Appropriations subcommittee handling CAA appropriations, prompted the study. He believes government should get out of the business of direct operation of airports.

Pay for Government Airport Space

Four government agencies are to meet soon with CAA's Office of Airports to discuss a plan whereby space used by these agencies at international airports would be paid for by the government. Involved are the Post Office Dept., U. S. Public Health Service, Immigration and Naturalization Service, and Customs Bureau. Most of their space is now paid for by airlines or furnished free by airports. CAA's next step: to induce agencies not performing any air traffic control functions to pay for space they used at domestic municipal airports.

Panagra Protests

There's a **fight developing over the proposal** of Braniff Airways to fly non-stop between Lima and Buenos Aires when it starts operations soon into the Argentine capital. Pan American-Grace Airways also flies between the points, but not non-stop (via Antofagasta), and protested vigorously to CAB that Braniff was creating new South American routes for which it was not certificated, and was putting itself and Panagra "one step further away from self-sufficiency." CAB said that on the basis of "incomplete" information available it appeared that the non-stop "may adversely affect the public interest." It added that its finding was without prejudice to the filing by Braniff of another non-stop notice. Panagra can be expected to fight it all the way.

78% U. S.

Latest information available to CAB **shows 3,775 planes in use** (including training and charter) by the world's scheduled airlines, and 78% of them were manufactured in the U. S. Figures don't include Russia and three other countries. Of the planes listed, 78% were built by only five manufacturers: Douglas, 2,132; Lockheed, 265; Consolidated Vultee, 217; deHavilland, 197, and A.V. Roe, 153.

More on Turboprops

Donald Douglas, president of Douglas Aircraft Co., thinks **it will be four years** before turboprop transports will be available for airline use. An acceptable engine isn't available now at an acceptable price, he says. His estimate on developing a pure jet transport: $40 million to $60 million.

A Larger Share

Foreign airlines carried 35.4% of the trans-Atlantic air traffic in the first quarter of this year against 29.3% in the same period last year. U. S. airlines' share of the business in the first quarter: TWA, 22.8%; Pan American, 22.5%, and American Overseas, 19.3%.

Bigger Equipment Needed

Look for Wisconsin Central Airlines to apply for an RFC loan, probably $300,000. Reason: it needs **DC-3's to replace its nine-place Electras.** Company kept track of passengers it was unable to carry out of Chicago last month—people actually on the waiting list. Total was 718, or almost $7,000 revenue. However, WCA can't get the loan until CAB acts on its certificate renewal. Other airlines, incidentally, are happy about WCA: its percentage of interline business is probably tops in the industry.

Two World Records

U. S. flag airlines operating internationally completed two years without a single passenger fatality on April 14th. This is a world safety record. The American air carriers operate 203,678 route miles internationally serving 239 foreign points on all the continents of the world.

During the two-year period the same international carriers carried nearly three million passengers approximately four billion passenger miles. This paralleled the safety of operations in that it also represented a world record in air-lift.

METAL GROWS, TOO!

Take a block of one of the toughest aluminum alloys known and chisel from it a high-speed turbine fan rotor like that shown above. Grind and polish to tolerances of one ten-thousandth of an inch—and you'd think it would be accurate enough.

But to give lasting performance in the cooling and pressurizing equipment built by AiResearch for today's supersonic jet airplanes, such high-speed wheels must be "grown" to perfection.

Each wheel, fan or rotor is placed in a vacuum test chamber resembling a wall safe. Here it is test-spun at speeds up to 150,000 rpm. Frosted coils control heat of air friction. At this enormous speed, the metal actually "grows" or expands—as much as 3/1000 of an inch—either revealing structural defects or releasing internal tension and achieving complete dimensional stability.

Such pioneering in design, manufacture and laboratory testing of precision equipment is typical of the day-to-day operations of the skilled scientists and engineers at work at AiResearch.

● Whatever your field — AiResearch engineers — designers and manufacturers of rotors operating in excess of 100,000 rpm — invite your toughest problems involving high-speed wheels. Specialized experience is also available in creating compact turbines and compressors; actuators with high-speed rotors; air, gas and liquid heat exchangers; air pressure, temperature, electronic and many other automatic controls.

AiResearch
DIVISION OF
THE GARRETT CORPORATION

An inquiry on your company letterhead will get prompt attention. AiResearch Manufacturing Co., Los Angeles 45, Calif.

News in Brief

Arcata Shut-Down: The Civil Aeronautics Administration has ordered that the Arcata Landing Aids Station, operated for the past several years by Transocean Air Lines, be closed, that the $11 million facility be dismantled and the equipment sent to the CAA's technical development division at Indianapolis. Annual cost of operating the research and testing station for the joint benefit of the Air Force, Navy and commercial airlines amounted to about $500,000 yearly. CAA and the military withdrew financial support for its operation this year. Some effort may be made in Congress to stay execution of the order.

Flight Plan Filing: Two new areas, along the Canadian border and in designated areas of the northwest, have been included in CAA's request for flight plan filing by all pilots. Affected are all southbound flights which cross the border east of the 87th meridian (Lake Michigan) but not those within continental U. S. adjacent to this area or northbound crossings.

Flight plans are requested from pilots entering the northwest defense area at any altitude from Canada or from more than 20 nautical miles seaward, or from pilots flying coast-wise adjacent to this area more than 20 miles seaward. Flights from within U. S. need file only if they are operating at more than 4,000 feet above terrain or more than 10,000 feet above mean sea level.

TWA Changes Name: TWA stockholders have voted an employees' retirement plan and have changed the corporate name of the company from Transcontinental and Western Air, Inc. to Trans World Airlines, Inc.

PAA Reports 1949 Profit: Pan American World Airways estimates its 1949 net earnings at $2,489,000 after federal income taxes of $1,470,000, compared with a 1948 estimated net of $4,891,000 after $2,942,000 taxes. PAA said exact 1949 earnings cannot be determined until conclusion of mail rate proceedings now pending before CAB. Gross revenues of $151,987,000 reported for 1949 included $13,967,000 for estimated U. S. mail pay after a reserve of $7,000,000 in excess of the $27,266,000 currently receivable under temporary mail rates.

World-Wide Rules Tariffs: The world-wide rules tariffs of the International Air Transport Association have been filed with CAB and Canada's Air Transport Board, to become effective June 1. Almost four years in the making, they will eventually reflect the terms and conditions under which all international cargo and passengers are transported by IATA members. Initially, however, only certain experimental rates will be governed by the new rules until necessary governmental approvals are obtained and possible deficiencies ironed out. Most of the original parties are U. S. flag carriers with the major European lines still presenting a formidable barrier to unanimous participation.

American, AOA Move Offices: American Airlines and American Overseas Airlines have moved to new headquarters at 100 Park Ave., New York. Involved were 575 employes formerly quartered in executive and general offices at 100 E. 42nd St. and regional and district sales offices in the Chanin Bldg., 122 E. 42nd St.

AAA Mail Pay: CAB has proposed $333,000 more mail pay for All American Airways for the first two years of operation. CAB said the feederline's financial condition, which was critical at the time of the last temporary rate order (Jan. 3, 1950) has further deteriorated since that time, necessitating a further increase in rates.

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"BUMPER"

Giant missile born of teamwork!

Miles above the earth, the slender "Wac Corporal" rocket blasts loose from a modified German V-2, and attains a speed of 5,000 mph and an altitude of 250 miles—fastest and highest flight by any rocket. This most successful firing, from White Sands Proving Ground, New Mexico, February 25, 1949, gave scientists important information on little known phenomena of outer space and other data required in missile research.

The "bumper" rocket used in this spectacular test was developed by Army Ordnance working with General Electric, California Institute of Technology Ballistics Research Laboratories, and Douglas Aircraft Company. Structural design of the "bumper" and construction of the "Wac" were among the contributions made by Douglas.

This is just one of the many missiles projects, so vital to America's defense, to which Douglas engineers have been devoting their skill and energies since 1941.

DOUGLAS AIRCRAFT COMPANY, INC., SANTA MONICA, CALIFORNIA

DEPEND ON DOUGLAS

30TH ANNIVERSARY YEAR

EDITORIAL

(CONTINUED FROM PAGE 1)

communities of the amount of subsidy required to support the airline services presently certificated to each community within the United States.

While we commend the Senator most heartily for his frank and honest attribution of air mail costs to communities, is there not a danger in carrying such an allocation to an extreme?

The airlines were once a political football, up to the creation of the Civil Aeronautics Board. What is needed is a *stable national transportation system*—something that can't be tinkered with each year by a partisan appropriations committee of Congress bent on removing air mail from communities in states that happen to be dominated by the minority political party at the time. Any return to the insecurities and inequities inherent in political control would be tragic.

However, the Johnson report is salutary in many respects and begins to finalize the question of costs of air service to small towns. As we have pointed out many times before, the national airline system could be made immediately self-supporting and immediately profitable—without mail pay—by confining it to high density routes. We still believe that the CAB is the proper agency for determining what service needs to be continued, but Senator Johnson's committee is to be commended, at this point at least, for bringing some vital issues to the front.

It Can Work

THAT PLANNING conference held in Oklahoma City May 2 and 3 for the initial purpose of reducing the number of aviation meetings held every year, as per our comments in this space last issue, brought some interesting results.

One could be very facetious and say that the net result of the conference was to organize two more annual meetings. Indeed, that is just what happened, but the kind of meetings proposed would seem to make a lot of sense.

Fifteen aviation organizations are going to comprise a new Conference of National Aviation Organizations which will meet twice a year to interchange ideas and achieve greater unity. No public sessions. No resolutions. Only two delegates from each organization. The first meeting will be in Washington, D. C., July 17. Sounds okay. Something good could come out of such a set-up.

Here are the organizations lined up so far:

Aeronautical Training Society, Aircraft Industries Association, Aircraft Owners and Pilots Association, Air Freight Association, Airport Operators Council, Air Transport Association, American Association of Airport Executives, Aviation Distributors and Manufacturers Association, Aviation Writers Association, Corporation Aircraft Owners Association, National Aeronautic Association, National Air Council, National Association of State Aviation Officials, National Aviation Trades Association, and National Flying Farmers Association.

One glance at that list is enough to indicate the need for coordination. The national conference will be a *working* group, not a convention or big conference or clinic. Now if the national conference can convince some of these outfits to hold their annual meetings in the same city at the same time, an additional benefit will be derived.

Other aviation organizations will be invited to participate. George D. Haddaway, the energetic editor and publisher of *Southern Flight*, has been named temporary chairman of CNAO, and Charles Frazer, executive secretary of the National Air Council, is temporary secretary. If the boys keep this as a working group, deal with down-to-earth problems, they have succeeded where many others have tried and failed. This time it looks to be the real thing.

And, hallelujah, they didn't decide on another big conference or clinic.

Frank A. Tichenor

FROM THE DAY in 1922 when he established *Aero Digest*, Frank A. Tichenor became a force in aviation in the United States. In recent years he hasn't been much in the national limelight but in earlier years he was the best-known champion of the Air Corps when it was fighting for meager appropriations. His death on May 4 was unexpected. Less than a week before Mr. Tichenor had mingled with the members and guests at the mid-year fiesta of Conquistadores del Cielo, the social aviation organization, at the Lexington Hotel in New York. We had had brunch with him the following morning. His health hasn't been good but no one expected him to pass away so soon. Aviation has lost a man who fought vigorously for it in those lean years of the 1920's and 1930's. When the breadbasket is full there is no lack of champions. Tichenor was there when the basket was nearly empty. He was a pioneer who will long be remembered.

Wilson Tries Again

GILL ROBB WILSON, the aviation columnist and old-time pilot and state aviation official, has won the Republican nomination for Congress for New Jersey's fourth district. This is good news and we hope he wins the election this fall. Congress can use some more well-informed aviation men, men who can help such stalwarts as Representative Carl Hinshaw of California carry the ball for aviation. In 1942 Gill Wilson narrowly lost the nomination for Senator from New Jersey. The Congressional seat he now seeks is currently held by a Democrat. It will be a fight but it's Gill's turn to win this time.

WAYNE W. PARRISH

Ram Jets get a 'Flight Engineer'

▶ A ***human*** flight engineer would have to shrink to the size of a gremlin to operate a ram jet. He would have to withstand temperatures from −100F. to +700F. . . . pressures from that at 100 feet under water to that at 80,000 feet in the air. On top of that . . . calculate and react in less than a second to complex mathematical problems.

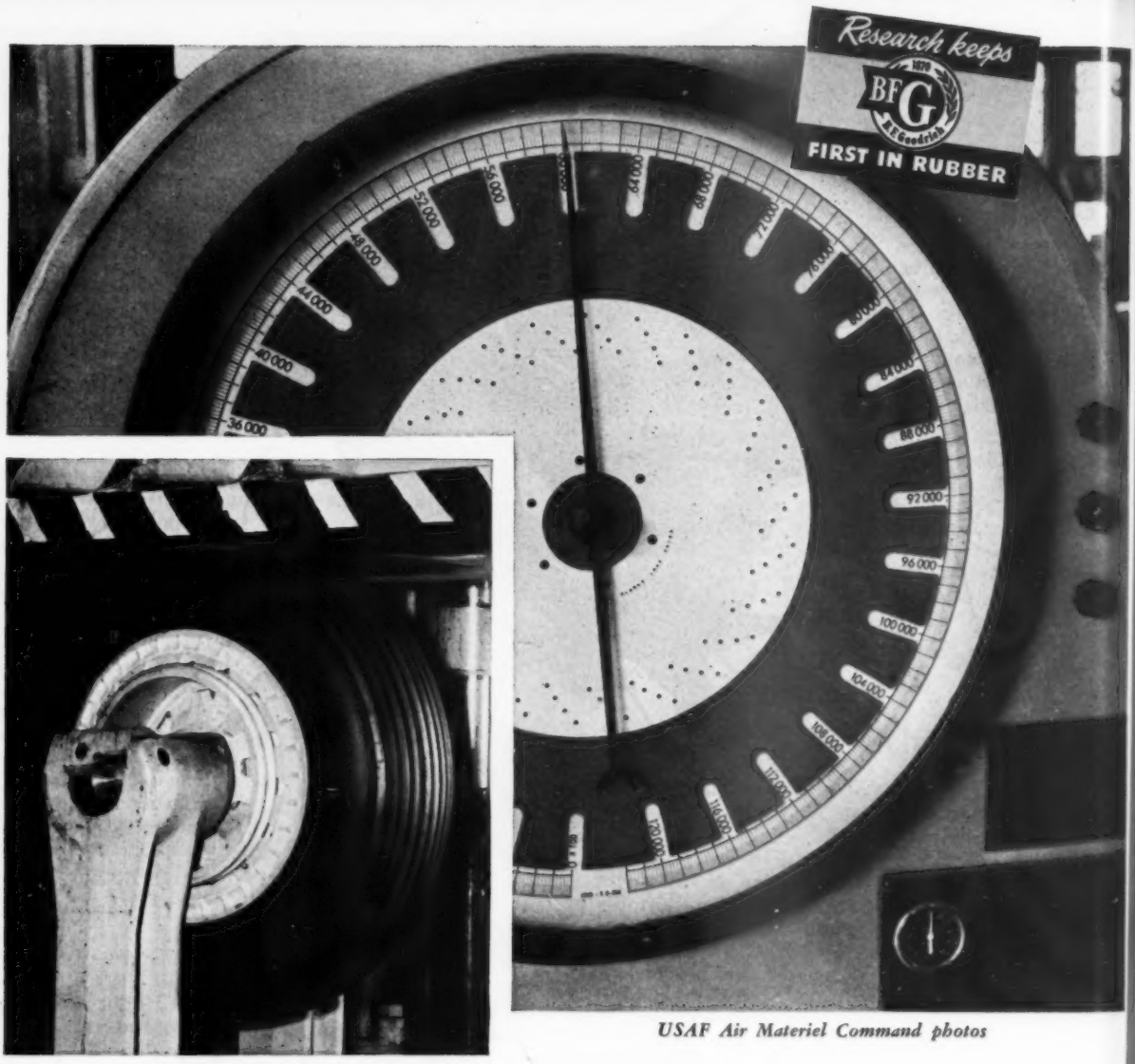
▶ Yet the ram jet needs a flight engineer . . . and gets one in Wright Aeronautical's new ***power control system.*** It performs ***automatically*** the functions of a flight engineer on a modern airliner.

▶ Actually it does a great deal more, for in ram jet operation, where supersonic speeds prevail, much wider ranges of air flow, temperatures and pressures are encountered than in any previous-type aircraft. The power control checks instantaneous changes in air density, determines the jet's fuel requirements, and actuates the missile's controls in a fraction of a second. Result . . . smooth, highly efficient engine performance.

▶ These power control units—and all other ram jet components—are now under development in Wright Aeronautical's new ram jet laboratory. Here is another indication of this company's leadership in supersonic ram jet research and development.

Wright Aeronautical Corporation, Wood-Ridge, New Jersey

CURTISS WRIGHT



USAF Air Materiel Command photos

New B. F. Goodrich wheel carries record load of 60,000 pounds!

THE AIR FORCE needed a new wheel for North American's B-45 — a 56 x 16 wheel with the unheard-of load rating of 60,000 pounds! That's about 15,000 pounds more than the strongest wheel made could carry.

B. F. Goodrich engineers went to work on the problem. They made dozens of design improvements, always with the goal of greater strength *without* major increases in weight and size.

You can see the results for yourself in the USAF photos above. The dial on the static load tester reads 60,000 pounds. Inset is the new B. F. Goodrich wheel that is taking this tremendous load. This wheel—with the greatest load rating of any airplane wheel in current production—has even stood up under test loads of 300,000 pounds! It has passed test after test with flying colors.

Used on North American's B-45 (Boeing's B-47 too), the new B. F. Goodrich wheel is equipped with the new BFG spider-type brake and BFG Type VII tires.

No matter what your landing gear equipment problems are, it will pay you to get the help of B. F. Goodrich engineers—pioneers of most of the major developments in this equipment. Write to *The B. F. Goodrich Company, Aeronautical Division, Akron, Ohio.*

B.F.Goodrich

FIRST IN RUBBER

ESTABLISHED JUNE 1, 1937

American Aviation

VOLUME 13 NO. 24

Shorter Runways for Jet Transports

By KEITH SAUNDERS

AIRPORT OFFICIALS attending the annual convention of the Airport Operators Council got a reassuring answer to a question that has bothered them a lot in recent months.

The question: Will the large transport aircraft of the foreseeable future make present airports obsolete and necessitate the construction of ever larger airports and ever longer runways?

The answer: No, in most instances.

The authority: D. A. Buck, sales engineer, Boeing Airplane Company.

Buck became concerned with this question because the airplane designer not only must design an efficient airplane which will best serve the requirements for range, traffic and operation established by prospective airline purchasers, but also must give serious consideration to the airport facilities that will be available at the cities into which an airplane is intended to operate.

His purpose, he said, was to acquaint the AOC members with the requirements for airports to serve what, in Boeing's opinion, will be the aircraft of the future. Because of the many "unknown quantities" and variables on which future designs are based, he added, there are a number of opinions as to the probable configurations of future transport aircraft and the resulting airport requirements, and Boeing has its own definite opinions, based on its experience in designing the B-47 and B-52 jet bombers and its almost uninterrupted testing of swept-wing jet planes in its own wind tunnel during the past three and one-half years.

Probable Speed—560

He said Boeing has made many design studies for aircraft of various gross weight classes with both low- and high-wing configurations, and practically all of the studies indicate a swept-wing jet-pod airplane with a maximum speed of 560 mph as the probable jet transport of the foreseeable future.

He reviewed briefly the historic trend of commercial aircraft relative to average blockspeed, gross weight and seat miles per hour in order to establish a base line from which to determine how far into the future-airport picture these planes are projected.

For a 20-year period beginning with the Boeing 247 and ending with the question-mark values for a future jet transport, Buck said the trend of these characteristics has been a steady increase in both the average block speed and in the gross weight, and these increases had resulted in a steady increase of seat miles per hour.

"One of the most important of several reasons for a jet transport is the increase in speed which will produce more seat miles per hour than a slower reciprocating engine airplane with the same number of seats," the Boeing engineer pointed out. "Thus, with an established jet transport average cruising speed of 500 mph, a relatively small increase in gross weight—or a related number of seats—produces a large variation in seat miles per hour."

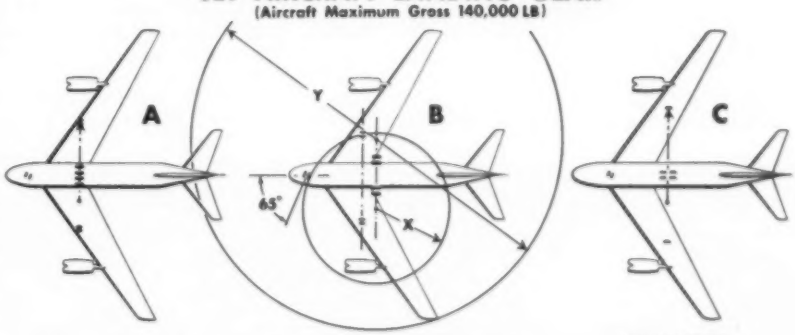
Design Question Marks

Stating that the increase in speed of the jet transport above the normal trend established by present-day conventional aircraft is expected to level off at this approximate value until such time as new sources of power and other technical improvements are developed, Buck said:

"It is at this point that the gross weight or number of seats question-mark is evident in establishing a transport that must meet the demands of normal airline growth, the effect of coach type travel, and the unknown influences such as utilization time for jet aircraft and added passenger acceptance for this type of travel."

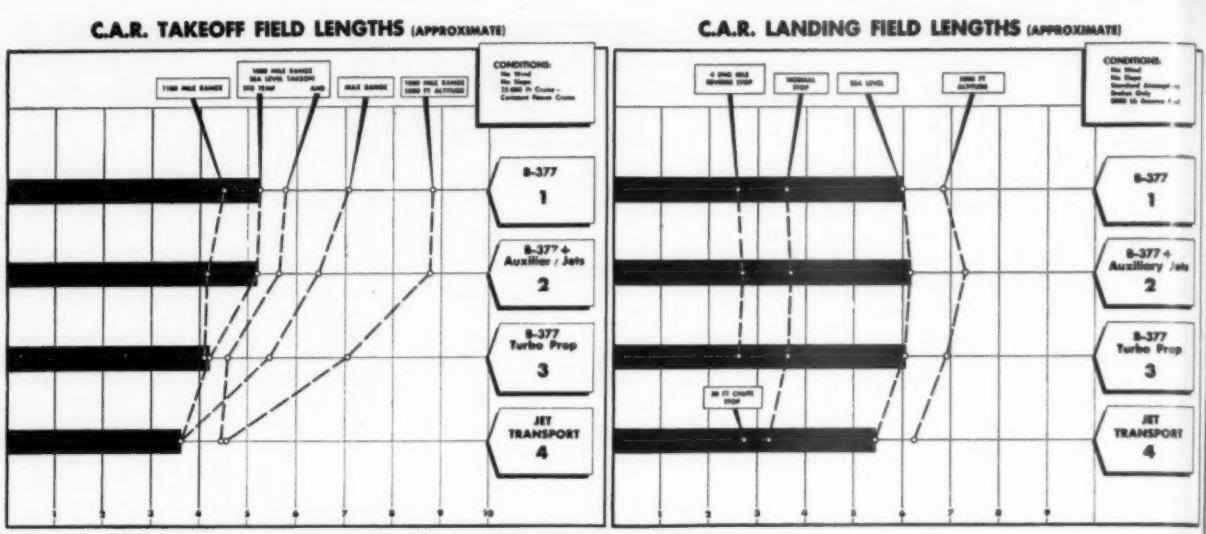
For the purpose of his presentation, he chose a low-wing jet trans-

JET AIRCRAFT LANDING GEAR
(Aircraft Maximum Gross 140,000 LB)



QUADRACYCLE TYPE — TRICYCLE TYPE WITH OUTRIGGERS — BICYCLE TYPE WITH OUTRIGGERS

	GEAR DESIGN (Approximate)		
	A	B	C
Wheel Rotation Diameter (X)	75'	75'	90'
Airplane Clearance Diameter (Y)	175'	175'	175'
Maximum Gear Loads	90,000 lb	70,000 lb	47,000 lb
Main Tire Size	46"	56"	45"
Main Tire Pressure	112 PSI	135 PSI	100 PSI
Foot Print Area	208 Sq. In.	230 Sq. In.	230 Sq. In.



For Example—These charts were presented by Buck to show the runway requirements of the Boeing Stratocruiser under existing design configuration and with modifications representing each of the major types now under consideration. It might be noted that he makes a case for shorter runways for the jet type aircraft.

port with a maximum gross weight of 140,000 pounds and 75 seats, capable of flying non-stop from Chicago to San Francisco with full payload and adequate reserves.

However, he pointed out, future airport planning should also consider the requirements of the further development of all current transports. Choosing the Boeing Stratocruiser as the most advanced of the current commercial transports in this country, he said the first step in its progressive development might be a version with two auxiliary jet pods installed outboard of the present R-4360 engines. This plane would cruise at 360 mph and have a takeoff weight between 153,000 and 165,000 pounds.

Turboprop Stratocruiser

Also, he said, in line with the belief that turboprop aircraft in the country will be developed from present transports, Boeing plans to install four turboprop powerplants in the Stratocruiser in place of the current engines. This transport will have a fuselage 10 feet longer, a gross weight of 165,000 pounds, and a cruising speed of 360 mph.

These advanced Stratocruiser versions, the engineer said, would have higher gross weights, payloads, wing loadings, gear loads and fuel capacities than the present Stratocruiser, DC-6 and Constellation aircraft, but the turning diameters and physical dimensions remain the same with the exception of 10 feet added to the fuselage of the turboprop version. And the design of a new pure jet transport has required a change in some characteristics that will be of interest to airport operators, he added.

He said perhaps the most important item is the reduction of wing loading to 47 pounds per square foot for landing gross weights, while other notable differences are the use of tires with pressures as high as 135 pounds per square inch, a tread of 50 feet between outrigger landing gears, and more fuel capacity.

Takeoff: A Civil Air Regulation takeoff field length comparison for an 1,800-mile range on a standard day and at a sea level airport shows that each progression from the Stratocruiser to the jet transport will require *less* rather than *more* field length, Buck said, because of the additional power that will be available.

He pointed out, though, that the jet transport is penalized more by hot day conditions than the other airplanes, and said that under the worst conditions of standard hot day takeoff with maximum gross weight at a 5,000-foot altitude airport, the proposed jet transport would require 5,925 feet of runway rather than its normal 3,600 feet.

The jet transport takeoff field lengths he quoted were based upon deceleration rates for the accelerate and stop distances that assume the use of a moderately sized parachute released at the point where the decision to stop is made.

Use of such chutes is a very desirable precaution, he said, in the absence of normal propeller drag or propeller reversing, and the use of this stopping procedure should not present any problems to an airport operator. He noted that the use of a small drag chute decreases the landing roll approximately the same distance as the decrease resulting from

Next Step—The next logical step in development of the Boeing Stratocruiser would probably be the addition of jet pods to the existing design. As shown here such a transport would have a maximum gross weight of 165,000 pounds.

Transport Characteristics Affecting Airport Design

	Present Transports			Future Transports		
	Douglas DC-6B	Lockheed Constellation	Boeing B-377	B-377 plus Jets	B-377 Turbo Prop	Jet Transport
Gross Weight (lbs.)	100,000	107,000	145,800	153,000-165,000	165,000	140,000
Wing Loading (lb./sq.ft)						
Maximum Takeoff	69	65	84	88-95	95	62
Maximum Landing	58	54	65	68	67	47
Maximum Gear Load (lbs.)	50,000	53,500	72,900	76,500-82,500	82,500	70,000
Tire Pressure (psi)	90	95	110	.....	.....	135
Allowable Cross Landing Wind (mph)	30	20	40	40	40	30
Payload (lbs.)	12,500	12,000	18,560	18,560	22,000	20,000
Passengers	52-70	48	61-75	61-75	73-87	75
Cargo Vol./Passenger (cu.ft.)	5.3-7.2	9	11.3-13.9	11.3-13.9	11.5-13.7	10
Height of Cabin Door (ft.)	9	10	10	10	10	10
Height of Cargo Door (ft.)	5	7½	5	5	5	8
Span (ft.)	117	123	141	141	141	139
Length	105′ 7″	95′ 7″	110′	110′	120′	104′ 3″
Height	28′ 5″	23′ 8″	38′ 3″	38′ 3″	38′ 3″	35′ 4″
Fin folded	.....	.....	26′ 7″	26′ 7″	26′ 7″	.....
Gear Tread	24′ 8″	28′	28′ 6″	28′ 6″	28′ 6″	50′ (Outriggers)
Wheel Turning Diameter (ft.)	66′ 6″	72′ 3″	78	78	78	75
Airplane Clearance Diameter (ft.)	142	152	170	170	170	175
Fuel Capacity (gals.)	4,700	5,790	7,790	9,190	9,190	10,000

Present and Future—This comparison of present type transports with various proposed Boeing transport designs shows the general characteristics which might be expected of the future types. It should be noted that there are no radical innovations. In most cases characteristics affecting airport design show some improvements over the present Stratocruiser specifications although the Stratocruiser is more critical today than the earlier designs.

two propellers in idle reverse on conventional transports.

Landing: It is the landing regimen, according to Buck, that presents "probably the most critical single design problem for a jet transport of this type because of the aerodynamic cleanliness of the plane and the absence of propeller drag." However, he said, the angle of approach and landing speed can be "made quite normal through the use of aerodynamic brakes, similar to dive brakes, and the use of a relatively low wing loading."

Another problem is the landing gear type and its airport requirements for maneuvering area and strength of runways. Buck sees numerous advantages to housing the main gear in the body of a jet plane; the wing can be aerodynamically cleaner, it will be free from structural cutouts, and more wing volume will be available for fuel.

Also, the added structure in the belly of the fuselage will provide a safety feature in the event of a wheels-up landing. Belly space, he pointed out, is used for the gear and not for inconvenient cargo space.

He said types of body-housed gear that have been studied are the quadracycle type and the tricycle or bicycle type with outrigger gear, and he noted that the wheel loadings of these types and turning diameter required for the wheels and the extremities of the airplane "are comparable with present transports and should require no special attention with the exception of the necessity of snow removal wide enough for the tread of the outrigger gears."

Buck added that "these various combinations of wheels and wheel loadings may require additional analysis of runway and subgrade stresses by airport construction engineers," and that this "might fit in well with a much-needed re-analysis of present runway design criteria."

Ground Handling: The ground handling and moving of commercial jet transports to the takeoff position remains as an unsolved problem, the Boeing engineer said, pointing out that since a plane of this type might use close to 1,000 pounds of fuel—equivalent in weight to five passengers—in taxiing to the takeoff position from many terminals, it may be advantageous to utilize some external source of motivation. He said Boeing has developed a self-propelled and steerable tug that may provide an answer to this problem.

Ground Clearance: The method of housing the jet powerplants in pods below the wing should not create any special problem for the airport operator, he said, and the clearance required for vehicles, ramp equipment and cleared snow piles will be the same or less than for a propeller-driven airplane. Additionally, a low pod position will leave the turbojet engine in an accessible location for station checks and minor maintenance at terminals without the use of large stands.

Jet Wake: Another matter considered by airport operators has been the effect of the jet wake on terminal areas, spectators and runway surfaces. Actually, Buck said, the jet wake patterns are quite local and it is not believed that this should cause concern in commercial operations.

Runway Lengths: The most important problem which the jet transport will pose to airport operators is that of runway length, Buck said, since the airlines will require and demand more efficient aircraft and such aircraft can be built only if airports are available for their use. But this does not mean, he cautioned, that great expenditures necessarily must be made in runway revisions or extensions.

The jet transport used in his study is designed, Buck said, to operate on 6,000-foot runways which are available at many airports today. A more efficient plane—designed to carry more ton-miles per hour—could be built if *one* main 7,000-foot runway was available at each major terminal, since this would satisfy the requirements of the plane under all wind velocities from zero to 30 miles per hour in any direction.

Summarizing, Buck told the AOC delegates:

"The gradual evolution of air transportation will make necessary certain changes that should be born in mind. However, we see no insoluble problems connected with the introduction of efficient, high speed jets or turbine propeller airplanes."

F-80
T-33
F-90

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Carrying on this tradition is the newest member of the Lockheed jet family, the rugged, twin-engined F-90 Jet Penetration Fighter, now undergoing evaluation tests by the U.S. Air Force.

This broad experience in the development of practical jet aircraft is invaluable in the Lockheed laboratories where the designs of the future are taking shape today.

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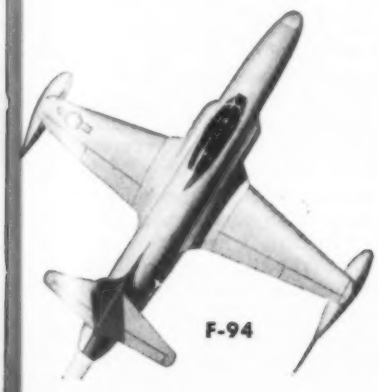
Aircraft Corporation, Burbank, California

Look to Lockheed for Leadership



F-94

Aircraft Power of the Future?

USE OF NEUCLEAR energy powerplants in aircraft installations will permit ranges beyond all practical requirements, perhaps the equivalent of three times around the earth. Application of neuclear power to projects which can be accomplished by present-day engines is impractical, the end results must be unique. Aircraft propulsion, said A. Kalitinsky, Fairchild engineer with the NEPA project, is such an application.

Speaking before The Institute of the Aeronautical Sciences recently, Kalitnisky outlined some of the problems associated with such an installation and introduced some new sketches (see cuts) of the manner in which neuclear energy can be applied to aircraft propulsion.

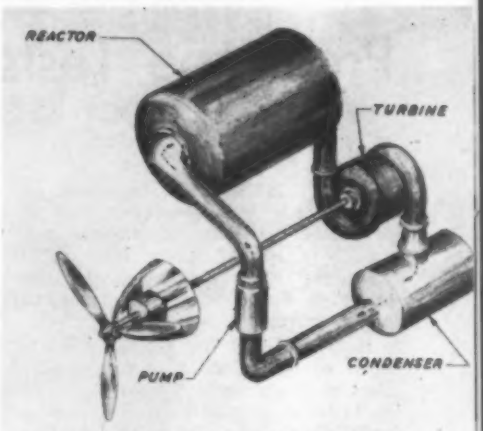
Neuclear power will apparently not bring about the introduction of new type power units. The atomic pile will simply act as a source of heat, replacing the liquid fuel now used in powerplants. This heat will have to be transformed into a working fluid and applied to a modified version of an existing engine: a steam turbine, turbo jet, ram jet or rocket.

The conversion of the reactor heat into a working fluid will require a heat transfer system, most probably a large aerial heat exchanger. On first glance this would appear to be a step backward but Kalitinsky indicated that advances in the science of heat exchanger design might remedy some of the more obvious shortcomings of such a system.

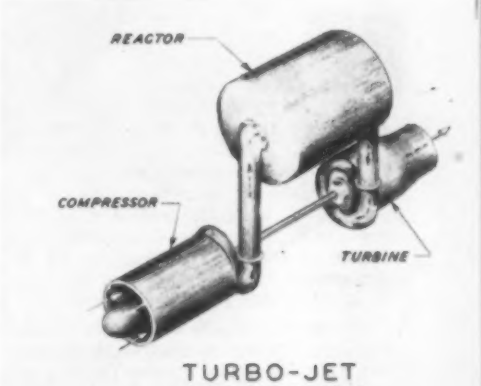
Proper shielding of the reactor to prevent harmful radiations is a major problem. Kalitinsky said that a suitable shield could probably be constructed using a material with a weight equivalent to the fuel load of a large aircraft. This would appear to represent weights of 125-150,000 pounds.

The minimum reactor size necessary to sustain a chain reaction would work against small power units. Takeoff and landing weights of the aircraft would be practically the same since there would be no appreciable "consumption." This would require new concepts in landing gear design. Further, the atomic ash from the reactor would have to be carefully provided for.

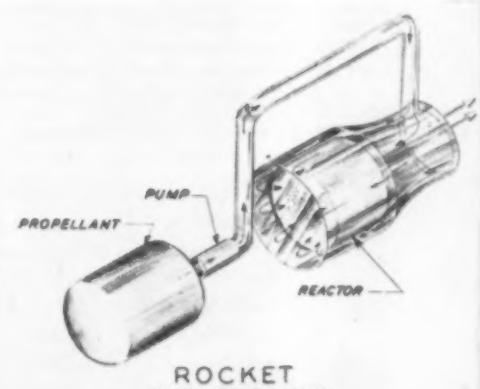
Metallurgical advances will play a sizable part in the progress toward atomic powerplants, Kalitinsky indicated. Use of a heat exchanging system, as now appears necessary, will require metals or other construction materials that can withstand temperatures much higher than present engine designs since the exchanger must be capable of standing temperatures much higher than the working fluid.



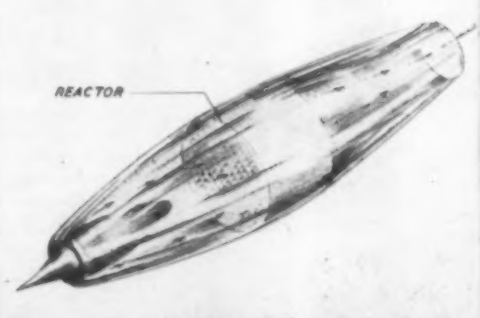
STEAM TURBINE
SCHEMATIC DIAGRAM



TURBO-JET
SCHEMATIC DIAGRAM



ROCKET
SCHEMATIC DIAGRAM



RAM-JET

Six Bills in Hopper . . .

Prototype Tests May Include Foreign Jets

By GERARD B. DOBBEN

THE PROSPECT for favorable action this session of Congress on prototype aircraft legislation was greatly enhanced early this month when the Budget Bureau gave its approval to a two-year testing program at an estimated cost of $12,500,000.

Hearings held the second week of May by the Senate Interstate and Foreign Commerce Committee were to lay the groundwork for government aid in a jet and turbo-prop aircraft testing project which was designed to furnish the airline and aircraft manufacturing industry with the basic data required to keep this country in the forefront in the field of commercial aviation.

While there were six so-called prototype aircraft bills before the committee, it was S. 3504, introduced by Senators Edwin C. Johnson (D., Colo.) and Owen Brewster (R., Me.) that was given the best chance of passage. This bill was drafted by the Air Coordinating Committee and appeared to have the support of all segments in the aviation picture, both in and outside of government.

The multi-million dollar project envisioned the use of the North American four-jet B-45 bomber as the jet prototype, the Douglas C-124 as the long-haul cargo prototype, and turboprop versions of either the Convair-Liner or the Martin 2-0-2 in operations over commercial routes to provide the necessary data to prepare an airplane flight manual in accordance with Transport Category Operation Rules and as a means of financing modifications and flight tests leading to CAA certifications.

Use of Foreign Jets

The hearings were scheduled to bring out government and industry thinking concerning the possible use of well-advanced foreign transport jet aircraft in the testing program. Informal discussion on this possibility centered largely around the Canadian Avro C-102 Jetliner which recently was flown to New York for exhibition purposes and Britain's de Havilland Comet which is now in production.

Attitudes of the governments involved, the availability of the aircraft concerned and U. S. industry reception to use of foreign aircraft here in a program designed to develop a jet transport manufacturing industry in this country were some of the elements to be explored. It was agreed that the bill itself does not prohibit the government contracting with some U. S. airline to experiment with these foreign aircraft although the "Buy America Act" of 1933, unless amended or repealed, might block such an undertaking.

Budget Bureau has approved a testing program which would cost $12,495,000 but as this issue went to press, it was engaged in revising the allocation of time and funds to the various phases of a two-year test program. In the original estimates of the Air Coordinating Committee, $1,000,000 had been allotted for the testing of six jet aircraft over commercial routes.

The allocation also included a sum of $385,000 for the conversion of two Convair-Liners or Martin 2-0-2's to turboprop versions. There also was allocated a sum of $2,500,000 for modifications and alterations found necessary during flight and service testing of three passenger jet prototypes and two cargo prototypes.

In its amended form, S. 3504 would be administered by the Secretary of Commerce rather than the Administrator of Civil Aeronautics as was provided in the bill as originally introduced.

Other prototype aircraft developmental bills included a comparatively recent revision of Johnson's bill to create a Merchant Marine of the Air. This bill, S. 3504, also introduced by Sen. Brewster, would establish the Aircraft Development Corp. with a capital outlay of $100,000,000 within the Department of Commerce for the purpose of insuring there will be sufficient efficient aircraft for both commercial and military needs.

Development Corporation

The corporation, directed by a chairman at $15,000 a year, would be empowered to not only contract the development of new types of aircraft but also procure existing types for sale or lease to U. S. citizens who are authorized by CAB to engage in air commerce. Provision is made for the government to recover a portion of the net profits realized from the operation of the aircraft.

A third bill, S. 2984, was related primarily to the development of a personal type aircraft but suitable for military service. This bill was sponsored by the National Association of State Aviation Officials and it would authorize the appropriation of $5,000,000 over a period of three years. The bill would create a National Civil Aviation Council, with the chairman of the National Advisory Committee for Aeronautics as chairman. There would be an advisory committee of seven members, one each from the Aircraft Industries Association, the Aircraft Owners and Pilots Association, the National Aviation Trades Association and NASAO and three appointed by NACA to represent the general public.

Because only the prototype testing bill had both government and industry support, it was considered unlikely that bills involving design, construction and sale would get through a Congress heading for an early adjournment because of forthcoming elections.

Welcome Visitor—The Canadian-built Avro C-102 Jetliner is shown flying over New York on its first flight into the U. S. This historic trip represented the first flight of a commercial jet aircraft in this country. The Jetliner flew from Toronto on April 18 to take part in the SAE's exhibition at Idlewild. It made the flight in 58 minutes at a block speed of 375 mph and burned 600 U. S. gallons with 1,800 gallons remaining.

Aviation Calendar

May 18-19—Corporation Aircraft Owners Association annual meeting and Third National Forum, Hotel Statler, Washington, D. C.

May 18-20—Women's National Aeronautical Ass'n annual meeting, Tulsa, Okla.

May 19-20—Institute of the Aeronautical Sciences 7th annual Personal Aircraft meeting, Lassen Hotel, Wichita, Kansas.

May 19—National Armed Forces Day Dinner, Hotel Statler, Washington, D. C.

May 20—Armed Forces Day.

May 20-21—National Air Carnival, Birmingham, Alabama.

May 22-23—Third annual Air Transportation conference, Purdue University School of Aeronautics, Lafayette, Indiana.

May 22-25—Society of Aeronautical Weight Engineers 9th annual conference, Hotel Miramar, Santa Monica, California.

May 23—Aircraft Technical Committee, Aircraft Industries Association, annual meeting, Hotel Carlton, Washington, D. C.

May 25-26—National Seminar for Feeder Airlines, University of Oklahoma, Norman, Okla.

May 27—Philadelphia Aviation Country Club 4th annual spring air regatta, Wings Field, Ambler, Pennsylvania.

May 27-28—Airlines Medical Directors Association 7th annual meeting, Palmer House, Chicago, Illinois.

May 29-31—Aero Medical Association 21st annual meeting, Palmer House, Chicago, Illinois.

June 1-3—Aviation Writers Association convention, Mount Royal Hotel, Montreal.

June 2-11—7th annual Michigan Aviation Week (sponsored by Aero Club of Mich.).

June 3-4—Fifth annual Shawnee Air Fair & Industrial Exposition, Shawnee, Okla.

June 4-9—SAE summer meeting, French Lick Springs Hotel, French Lick, Indiana.

June 4-9—CAA Airport Advisory Committee meeting, Everglades Hotel, Miami, Fla.

June 10-13—National Aeronautic Association 28th annual convention, Hotel Statler, St. Louis, Missouri.

June 11-13—Aviation Distributors and Manufacturers Association mid-year meeting, LaSalle Hotel, Chicago, Illinois.

June 26-30—American Society for Testing Materials annual meeting and exhibit of testing apparatus and equipment, Atlantic City, New Jersey.

July 12-14—Institute of the Aeronautical Sciences annual summer meeting, IAS Western Headquarters Bldg., Los Angeles, California.

July 14-16—National Pilots Air Meet and Races, Chattanooga Municipal Airport, Chattanooga, Tennessee.

July 30-Aug. 13—National soaring contest, Grand Prairie, Texas.

Sept. 2-4—National Air Races, Cleveland, Ohio.

Sept. 4-6—National Flying Farmers Association annual convention, Bemidji, Minn.

Sept. 28-30—Air Reserve Association annual convention, Hotel Texas, Ft. Worth, Tex.

International

July 30—ICAO Fourth Assembly, Montreal, Quebec.

July 30—ICAO Legal Committee meeting, Montreal, Quebec.

Sept. 5-10—Society of British Aircraft Constructors annual flying display and exhibition, Farnborough, England.

Sub-Hunting Seaplanes must be Rugged to be Right

The Navy's new Martin P5M-1 is a tough customer—built to stand the pounding a seaplane takes in anti-sub operations from rough seas in dirty weather.

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The Martin P5M-1 combines the latest electronics and armament systems into a most effective weapon for the location and destruction of submarines. Designed to succeed the famous Martin PBM Mariner seaplane series, it is further evidence of the advanced aircraft-weapons engineering Martin offers its customers today! THE GLENN L. MARTIN COMPANY, Baltimore 3, Md.

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Filling in the Blanks . . .

SC-31 Program Gets Down to Facts

By WILLIAM D. PERREAULT

THE MOST important single development in air navigation and traffic control since the Radio Technical Commission for Aeronautics SC-31 report is now underway. A top-level group of operations and engineering experts are meeting almost daily in an attempt to define the manner in which the provisions of RTCA's 15-year program for improving air traffic control and navigation can best be implemented.

The report of Special Committee 31 of RTCA provided the broad outline of a "Common System" of air navigation and traffic control usable by military and civil traffic, commercial and private planes. This program has been implemented to some degree during the past 18 months and the equipments for the transition phase have been developing at an encouraging pace.

But there has been a sharply defined need for more details as to the final form of the equipments, how the transition will be made from the present equipment and procedures to each successive stage to insure maximum use of the interim equipment. Almost every phase of future development is linked to other phases and each must await a clearer definition of the other.

No one individual can be associated with recognition of this dilemma and its affect on the progress of the RTCA program. However, the nature of the need was probably best expressed by Sam Saint, ATA's director of ANTC, while speaking before the RTCA last fall. Saint urged that a "properly constituted body" be formed to "narrow down the SC-31 requirements—to put in the operational tolerances, to decide exactly what information will be tranmitted when and how often, to decide what information will be placed in front of controllers and in what form, and how they will use it."

Wide Representation

The new Operational Policy Working Group is that "properly constituted body." Represented on the OPWG are the Air Force, CAB, Coast Guard, Dept. of Commerce, FCC, Navy, Air Coordinating Committee, Air Navigation Development Board, ATA, ALPA and Airport Operators' Council. Others have been invited to join, including the Aircraft Owners and Pilots Association, to insure lightplane representation.

In full-time operation since Feb. 16 when the organization was formed, Working Group 5 represents a combination of top talent keyed for action. Through the high-level backing of the Air Coordinating Committee and the NAV panel, industry groups were urged to send members best qualified to make decisions and with the authority to make the decisions.

Recognizing the true importance of the program each organization has insured continuity of service by their representatives. This ability to keep the same membership is important since previous planning groups were seriously retarded by transient membership.

12 Major Fields

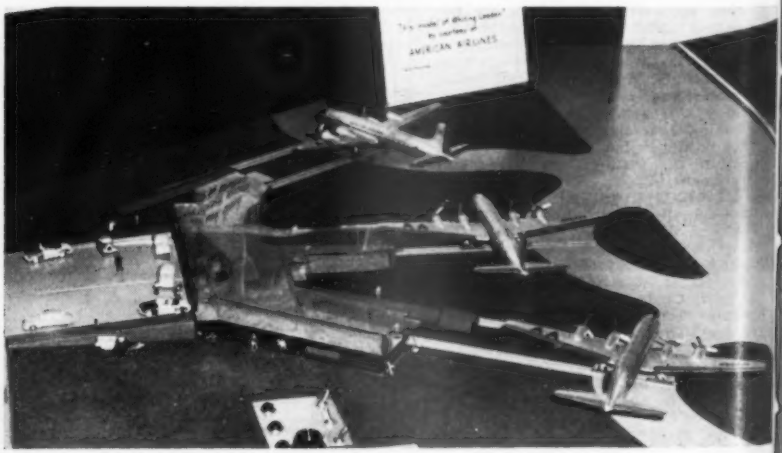
Saint had outlined the areas of possible confusion most closely related to his own field, that of operations. Under the capable chairmanship of Cmdr. A. W. Wuerker, USCG, the working group delved into the parallel limitations relating to other associated fields. As a result 12 major fields of investigation were established. Eight of these are already activated, having been officially announced on April 27, while the remaining four must await answers to be provided by the basic eight groups.

As represented by the committee assignments, the problems can be divided into: demand, dispatch authority, terminal area, airport, traffic flow requirements, en route navigation and traffic control, off-airways flying and classification of aircraft. Meteorological considerations which tie into each of these fields plus human factors of parallel importance are pinpointed for special consideration.

Considerable data has been accumulated on each of these subjects. Many learned papers and discussions on each has taken place. The basic working group has already made field trips into Boston and New York to discuss specific phases of these problems on the scene. How is the mechanical interlock equipment working out, which are the real and which are the theoretical problems related to traffic control and airport utilization at the world's busiest field?

The working committees will carry on this investigation and compilation of data, and sort out the facts from the fiction. To direct the committee efforts along the proper channels Wuerker and his group have established a format to be used by the committees in their reports. The reports will represent conclusions and reasoning, not merely the issues involved.

As a further guide all the affected agencies have been asked to submit



Plane Loading Aid—This model of the newest wrinkle in air cargo loading and unloading attracted keen interest when exhibited at the recent Airport Operators Council convention in Cleveland. A plane is taxied onto three small tables (one for each wheel), is automatically chocked, and is then pulled by underground cables and a power winch into position with its main cargo door up against the loading dock. Arrangement obviates much maneuvering, enables more planes to be parked in less space, calls for less concrete and reduces taxiing accidents. It's a development of the Whiting Corporation, Harvey, Ill., and is being considered by American Airlines for an experimental installation at Newark Airport.

pertinent questions covering every phase of the over-all problem as related to their operation. Each committee has been issued a list of about 30 of these controversial and deep-rooted questions which must be answered within the bodies of their reports. Other questions will be added while the study is under way.

First Report

Within the next two months the first of these committee reports will be submitted to the Operational Policy Working Group for consideration. Here the OPWG will throw it open to active discussion with an eye toward finding any vulnerable spot in its reasoning or conclusions. The result will be a final report covering this phase which will then be submitted to the industry at large for comment.

Following this, each report, with modifications as required, will become one chapter in a master book outlining in detail the manner in which the RTCA program will be implemented. Like the report of SC-31, it will spell the best thinking of the day on the over-all aspects of air traffic control and navigation, only with the dimensions in place.

The last of the reports and the completion of the Operational Policy Working Group's work will probably be submitted late in the Fall. This should clear the way for CAA and other agencies charged with the responsibility for implementing the program to move ahead with the knowledge that the operational details will fit within the intent of the master working plan, the RTCA SC-31 report, and the range of practical application.

Curry Elected to Head Airport Operators Council

A. B. Curry, director of the Dade County Port Authority at Miami and chairman of CAA's Airports Advisory Committee, was elected president of the Airport Operators Council at the organization's third annual convention in Cleveland. Other officers were elected as follows:

C. J. Lowen, Denver, first vice president; Louis R. Inwood, Kansas City, second vice president; Leander I. Shelley, Port of New York Authority, general counsel; and C. C. Thompson, executive secretary. Named as directors were: Fred M. Glass, Port of New York Authority; J. G. Bastow, Oakland, Calif.; and Oscar E. Hewitt, Chicago. Outgoing president was B. M. (Mike) Doolin, of San Francisco.

The convention drew approximately 150 registrants from all of the nation's top commercial airports, including Eddie Holohan of San Juan, Puerto Rico, and Ralph Honda of Honolulu.

Republic YF-96A—This is the Air Force's latest fighter—the Republic YF-96A, a development of the F-84 Thunderjet design. The fuselage is the same as that of the F-84, but the wings and tail surfaces have been swept back and a more powerful engine, the Allison J-35-25, substituted. The engine is rated officially at 5,200 pounds thrust, but is actually more powerful. Here Oscar P. Hass, Republic's director of flight, discusses the plane with a visiting Air Force officer. Hass, a grandfather, will handle the plane in the initial phase of its test program. It is now at Edwards AFB, Muroc, Calif., preparing for first flight.

People in the News

Norman P. Seagrave, secretary of the economic division of the Air Coordinating Committee, has been appointed by President Truman to be alternate U. S. representative to the Council of the International Civil Aviation Organization. He succeeds **Dr. Paul David**, who resigned to accept a position with the Brookings Institution. **Ronald Kinsey**, former vice president of Continental Air Lines in Washington, has been appointed to Seagrave's old position.

George W. Burgess, former Deputy Administrator for Civil Aeronautics, has been appointed loan officer of the International Bank for Reconstruction and Development in Washington.

Vice Adm. Russell S. Berkey, former commander of the 7th Fleet in the Pacific, has taken over new duty as Chief of Navy Information at the Pentagon.

First Flight—The Navy's newest flying boat, the turboprop-powered Convair XP5Y-1, takes off on its initial flight. Designed for long-range search-rescue missions and anti-submarine use, the plane is capable of taking off in less than 30 seconds. Powered by four Allison T-40 engines rated at 5,500 hp each, the XP5Y-1 has a top speed of more than 350 mph.

Between the Lines:

Exercise Swarmer

By James J. Haggerty, Jr.

LAST MONTH we attended Exercise Swarmer, a joint Army-Air Force tactical maneuver in the Fort Bragg-Camp Mackall area of North Carolina. Swarmer was a simulated tactical airborne problem, complete with two divisions of paratroops who carried on a mock war against an "Aggressor" force.

The real objective of Swarmer, however, went beyond paratroop training. The Army and Air Force wanted to find out all they could of the problems of establishing an "airhead" in enemy territory and keeping that airhead supplied and expanding it. And they found plenty, but they also came to the conclusion that the employment of airhead tactics in actual warfare is entirely feasible.

Briefly, the plan of the maneuver was this: Aggressor forces, landed from troop-carrying submarines, had invaded the U. S. in the vicinity of Wilmington, N. C., on the coast and were driving toward the Winston-Salem industrial area. To repel the advance, the U. S. had assembled about 60,000 troops; for purposes of the maneuver, however, it was assumed that the territory held by the enemy was an island, so the only way to start a counterattack was to establish an airhead within the enemy lines and expand it. The troops, their weapons and 20,000 tons of equipment had to be pushed through the airhead entirely by air.

On D-Day, some 4,000 paratroops of the 82nd and 11th Airborne Divisions dropped on Camp Mackall, the site of the airhead, and seized the airstrip from Aggressor forces. Then the real problem began. On a scale reminiscent of the Berlin air lift, about one landing every three minutes, Douglas C-54's and C-74's and Fairchild C-82 and C-119 Packets shuttled into the airhead and disgorged troop reinforcements and supplies to expand the airhead. They kept it up for a week, until the umpires decided that enough troops and supplies had been flown in, the airhead had been expanded and the operation was a tactical success.

Aside from the training given the troops, Exercise Swarmer was a well worth while problem in that it pointed up a number of things which some top commanders had already suspected. Probably the most important item was the discovery, or the confirmation of earlier beliefs, that a civilian reserve fleet would be of little use in this type of operation. For some time there has been considerable agitation to build up a civil transport fleet of airline type aircraft for emergency utilization. No doubt such planes could be put to good use in transport operations, but for tactical duty they are, as one observer put it, "more trouble than they're worth."

Troublesome Equipment

The reason for this is the wide variety of odd-sized and hard to handle equipment the Army requires to support an operation of this sort. A large portion of this equipment simply could not be handled by the C-54's or even by the much larger C-74's, not so much because of the capacity of these planes as of lack of adequate loading and unloading head room and ramp facilities.

This inability of the transports to carry bulky equipment hampered the Army considerably, aside from the time consumed in loading and unloading. Recognizing the deficiency, the Army had redesigned a lot of its ground equipment so that it could be air-transported. However, this makeshift equipment, in a lot of cases, did not function properly. As a military observer who watched the show with us remarked, "They've put the cart before the horse. We've got to design the aircraft to carry the equipment, not the equipment to fit the aircraft."

Another thing which Swarmer pointed up was the need, in an airhead operation, of some sort of detachable fuselage aircraft, not only to cut loading and unloading time, but for specialized applications. Two examples of this were the ground controlled approach system and machine shops necessary for the operation.

Since it had been decreed that, for training purposes, all landings would be made on GCA, the equipment had to be in the airhead and operating early in the maneuver. But since no one plane could carry a whole GCA system, and since it would take some time to set it up, it was necessary to take the equipment in by surface transportation, days before the paratroops dropped on the airhead. The same was true of the machine shops. Obviously, in an actual combat assault, the enemy might have taken a dim view of the invaders' setting up shops right in the middle of their camp.

'Pod' Aircraft Needed

The solution is obvious to some Tactical Air Command observers—a detachable fuselage aircraft carrying an entire GCA system (or a machine shop) in a "pod" could fly into the airhead in the first wave, detach the pod, and there would be a complete GCA unit (or machine shop) ready for instantaneous operation.

The star of Swarmer was the Fairchild C-119 Packet, making its "combat" debut. Army and Air Force officers alike were enthusiastic about its performance. The easy manner in which heavy equipment, such as 155 millimeter howitzers and two and one-half ton trucks, was loaded onto and unloaded from the new Packets won everyone's plaudits.

Another star of the show was the giant Douglas C-124, a forecast of things to come. In a static demonstration, the No. 1 C-124A, fresh from the production line, showed the ease with which it could load a huge M-24 tank (via its built-in nose ramp) and a jeep (via a rear elevator) simultaneously. To Army Field Force officers who had never seen the plane, which dwarfed even the king-size Boeing Stratofreighter parked alongside it, the C-124 demonstration was the most impressive part of Swarmer. With 66 of these planes on order and in production, the next Swarmer, if there is one, should be considerably more efficient.

One thing noted by Field Forces observers was the need for assault-type transports, which could land on unimproved fields. In Swarmer, the 200-odd transports had a nice, solid concrete runway to land on; chances are this would not be available in a combat operation. The Army feels that a new type assault transport, or Packets equipped with track-tread landing gear, are essential to an airhead operation.

Finally, a vote of thanks to maneuver commander Lt. Gen. Lauris Norstad of the Air Force, who threw over the customary Pentagon policy of trying to cover mistakes, and instructed his staff to be perfectly frank about the shortcomings of the operation. It was a refreshing change.

Industry Personnel

Frank N. Piasecki, founder of Piasecki Helicopter Corp., has been named to fill the new post of chairman of the board and will continue to be in charge of the company's research and development program. **C. Hart Miller** has been elected president, and the following other officers have been elected: Wesley R. Frysztacki, vice president-secretary; Harry S. Pack, vice president; Elliot Daland, vice president-research and development; and William Palmer, treasurer, controller and assistant secretary.

A. F. Logan, director of industrial relations for Boeing Airplane Company since 1946, has been elected vice president-industrial relations. He joined Boeing in 1943 as assistant to the president.

R. K. Griffin, Norman J. Greene, Eugene N. Hunting and **Thomas F. Piper** have been elected as new directors of the Piper Aircraft Corporation.

Roger Lewis, former vice president-sales of Canadair Ltd., has been named director of sales for Curtiss-Wright Corp. Prior to joining Canadair in 1947, he had been with Lockheed Aircraft Corp. since 1934 in both production and sales capacities.

Lewis

Gordon Hileman, formerly chief draftsman with Aeronca Aircraft Corp., has been named assistant sales and service manager.

N. D. Showalter, assistant chief engineer of Boeing Airplane Company, has been placed in charge of Wichita engineering while retaining his present position. **Harold W. Zipp** has been named executive engineer, directing all engineering administration and staff activities for the Wichita division. **George C. Martin** has been made chief of the combined B-47 engineering projects in Seattle and Wichita, while **John J. Clark** has been named senior B-47 project engineer in Wichita.

C. Stewart Ferguson, formerly with General Electric Company, has been appointed as technical director of the Marshall-Eclipse Division of Bendix Aviation Corporation.

Flood S. Bennett, Jr., has been promoted from assistant comptroller to treasurer of the Fairchild Engine and Airplane Corporation. **Arthur F. Flood,** vice president and director, who has been holding down the combined jobs of treasurer and comptroller, continues as comptroller. **P. A. Britner** succeeds Bennett as assistant comptroller.

Wayne D. Cannon, associated with the Wright Aeronautical Corporation for the past 3 years, has joined the European sales staff of Lockheed Aircraft Corporation.

Production Spotlight

Procurement Boost: As the military appropriations bill went before the House this week it appeared that aircraft procurement funds were in for a boost, as Defense Secretary Louis Johnson reversed his earlier position and recommended a $300,000,000 increase in procurement money. The House Appropriations Committee promptly approved his recommendation. The money, if passed by both houses, will permit the Air Force to buy an additional 77 aircraft, for a total of 1,460 in fiscal 1951, modernize 228 primary trainers and convert 71 Boeing B-29's for air-to-air refueling. The Navy would be able to buy 95 more aircraft for a total of 912.

Equipment Contract: *AiResearch Manufacturing Co. scored a big victory in the component manufacturing field when it was awarded the contract to supply the pressurization and air conditioning for the fleet of 65 Martin 4-0-4 twin-engine transports recently ordered by Eastern Air Lines and Trans World Airline. The major units of the AiResearch system will include the cabin supercharger, the turbine refrigeration unit, cabin pressure regulating and cabin temperature controls. The 4-0-4 pressurization and air conditioning will include cabin altitude and temperature control from 1,500 ft. below sea level to above 20,000 feet. It will maintain sea level conditions up to 7,000 feet and a safe, comfortable differential pressure up to maximum altitude. Cabin altitude and rate of altitude change can be pre-set by the pilot.*

Flight Test: **Republic Aviation Corp.'s YF-96A,** swept-wing version of the F-84 Thunderbolt (see photo, page 19), is now at Edwards AFB, Muroc, Calif., preparing for first flight, scheduled for the latter part of this month . . . The Air Force is about ready to start flight test work with the **Bell X-1A,** improved model of the first supersonic airplane, the Bell X-1. In one version, the X-1A, equipped with a new fuel system, has a design speed 700 mph faster than the X-1, which reached a top speed of about 960 mph during its flight test program . . . The last of the **Northrop Flying Wings,** the YRB-49A, has successfully completed its first test flight. The YRB-49A has a six-jet configuration; four of the engines are located in pairs in the wing on either side of the cabin, while the other two are hung in single pods under the wing . . . Difficulties with the new Allison T-40 turbo-prop engine have held up the first flight of **Douglas Aircraft Co.'s** new Navy attack bomber, the A2D, but the plane will probably fly this month. It has been named the "Sky Shark." . . . The Air Force's **Convair XF-92A** delta-wing fighter has been returned to Convair's San Diego plant for modifications to give the plane more power before continuing flight test work. A late model, higher thrust version of the **Allison J-33** jet engine will be substituted for the earlier 4,600 pound thrust J-33 and an afterburner will be added for extra thrust. The XF-92A has completed about 75 flights to date.

Deliveries: *The first completely modified Boeing RB-50B multi-purpose bomber has been delivered to the Air Force and will be flown to Eglin AFB, Fla., for cold-weather testing in the Air Force's Climatic Hangar. The RB-50B modification work is being done at Boeing's Wichita plant . . . Lockheed Aircraft Corp. has delivered the first of four Constellations to South African Airways at Johannesburg. The Connies are the L-749 type, seating 42 passengers . . . North American Aviation, Inc., has delivered the first T-28 trainer to the Air Force. It is now undergoing accelerated flight testing at Edwards AFB, Muroc, Calif. . . . The Naval Air Development Center at Johnsville, Pa., has taken delivery on the first two of a production order of KDM-1 pilotless target aircraft, built by The Glenn L. Martin Co. The KDM's are drone aircraft with a 10-foot span, powered by ram-jet engines manufactured by Marquardt Aircraft Co.*

Giant Glider: The world's largest glider, the **Chase CG-20,** made its public debut at a static demonstration at Pope AFB, N. C., during Exercise Swarmer. The plane had made its first flight only a week earlier. The glider can fly at a maximum gross weight of over 70,000 pounds, but since there is no tow plane which can handle it at that weight, it is limited to about 40,000 pounds. Spanning 110 feet, it can carry 60 fully equipped troops. Only one was built. It will be used to accumulate glider data, then returned to the Chase plant to have engines installed for evaluation as an assault transport (it is a powerless counterpart of Chase's XC-123 assault transport.)

—J. J. H.

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More Details on Allison's Turbo-Prop

By RICHARD G. WORCESTER

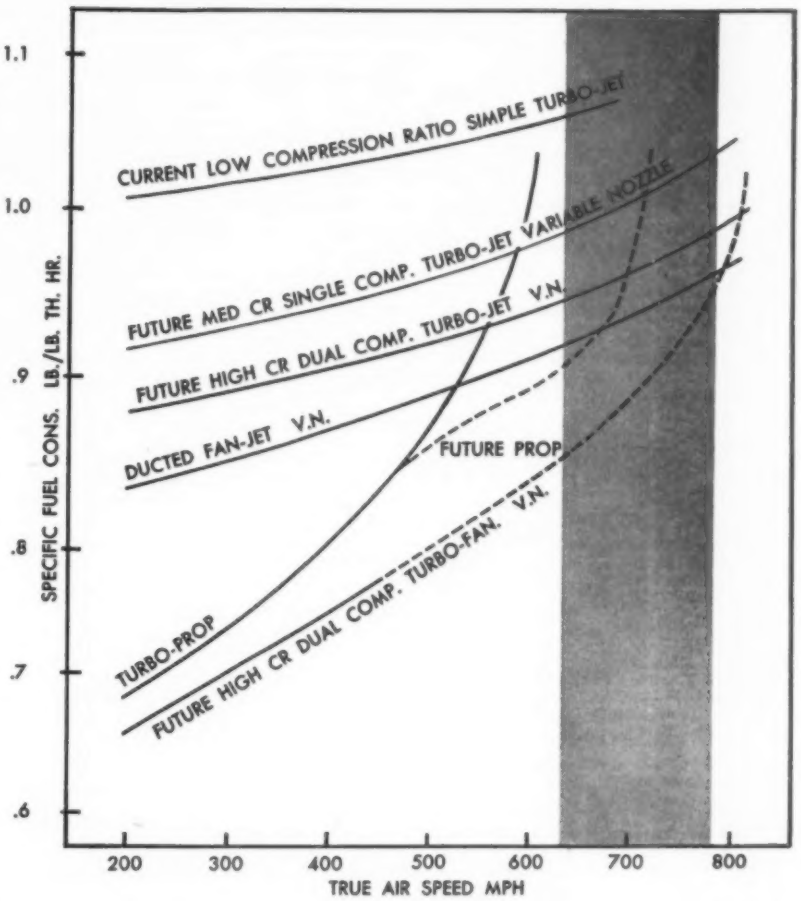
ALLISON has at the moment under active development the T-38 turbo-prop of 2,750 equivalent horsepower which drives a single Aeroproducts four-bladed propeller of 13½ feet diameter (activity factor 122). The T-40 coupled version of the T-38 swings an Aeroproducts six-bladed contra-prop of 15 feet diameter (activity factor 132). It has also been reported that a power bank of four T-38 engines is being developed and when the six-bladed propeller is fully developed it will be able to take the additional output.

The T-38 and the British Proteus have almost certainly ended another chapter in turbo-prop development. With compression ratios of 6.3:1 and 7:1, respectively, they both have single-rotation compressors and fixed nozzles. The next phase will open with dual-rotation compressors of about 10:1 ratio with ducted or unducted fan, variable nozzle and afterburning.

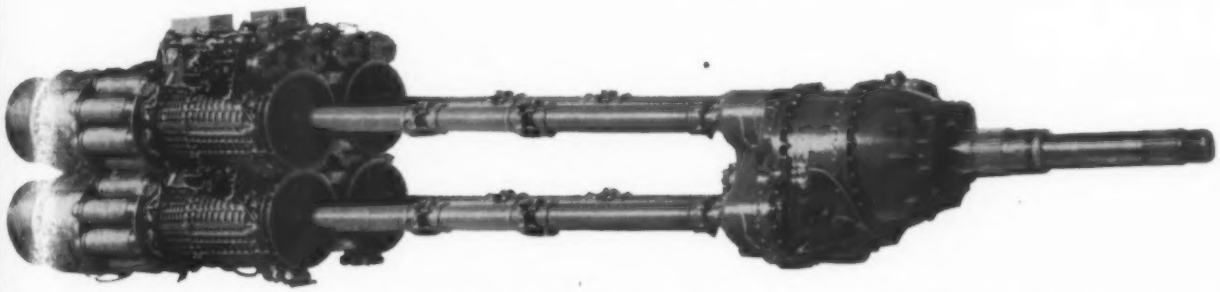
This article sums up some broad aspects of the Allison design policy which became evident during the course of the recent Society of Automotive Engineers conference and exhibition. It is clear that they intend using an electronic system for propeller or fan control and are also considering its use for operation of a variable nozzle. The present state of knowledge is such that other manufacturers are using mechanical controls and, unlike Allison, are retaining a turbine shroud. Nobody can accuse gas turbine technology of being a rational science yet.

New Features

As regards the T-38 itself there are several new features. The high rotational speed of 14,000 revolutions per minute has dictated the use of a very small diameter compressor and the steel alloy blades on the first few



Vital New Figures—In his paper delivered to the SAE, R. M. Hazen of Allison said he was not permitted to give the exact fuel consumption figures for future types of jet and prop jet engines. However, by entering consumption figures onto the current types of engines the missing figures—which must be regarded as only approximate—appear with clarity. Later in his paper Hazen said that the advantage in fuel consumption obtained by employing dual compressors, very high compression ratios, ducted fans and after-burning apply also to newer types of turboprop engine. This graph has been compiled by American Aviation after combining these premises and affords a clear picture of the fuel consumption to be expected for the turbo-fan engine. Incidentally it establishes the case for the supersonic fighter with an unducted fan.



Turbo-Quad Project—This montage impression of an Allison Turbo-Quad, or paired T-40, shows that all four engines can fit compactly behind the spinner of the Aeroproducts propeller. Some further rearrangement of the accessories would be necessary and they could be grouped to fit into the space available in the wing.

Fastest Aircraft In the Free World

Table Of Mach Number Limitations

Research Aircraft	Engine (1)	Sweep°	Max. Level TAS mph	Mach crit (2)	Mach max (3)	Notes
Bell X-1A (not flown) ...	R	..	...	nil	2.56	Turbo-pump fuel system aircraft only
Bell X-1	R	..	760	nil	1.46	Lack of power
Douglas D-588-2 Skyrocket	RA	35	750	nil	1.4*	Flight tests continuing
Convair XF-92 Delta	A	60	640	nil	1.1*	Lack of power and intake strength
de Havilland DH108	C	35	635	nil	1.04	Lack of power; 685 mph TAS max.
Supermarine 510	C	40	630	.98	....	High tail loads. Changes to controls should make this a sonic aircraft.
Experimental Aircraft						
North American XF-93 ...	A	35	650*	nil	1.1*	
McDonnell XF-88	A	35	635*	nil	1.05*	
Lockheed XF-90	A	35	620*	nil	1.00*	
Republic XF-91 (inv. taper)	RA	35	620	nil	....	Without rocket unit
Hawker P.1052	C	35	620	.91	....	Unswept stabilizer
Dassault Ouragon (Fr)	C	35	600	.90	....	Flight trials re-starting. Sonic or supersonic potentialities.
Northrop YRB-49A Wing ..	A	28	460	.70	....	With pods
Production Aircraft						
North American F-86	A	35	650	.95	1.00	Placard speed 645 mph IAS; performance probably improved on F-95.
Chance Vought XF7U-1 ..	A	35	650	.95	....	
Grumman Panther F9F ...	C	..	610	.84	....	Placard speed 575 mph IAS
McDonnell F2H-1	A	..	630	.83*	....	
de Havilland Venom	C	20*	600*	.83*	....	
Boeing B-47 bomber	A	35	590	.83	....	Speed quoted for experimental version with J-35 jets; production bombers higher
Gloster Meteor 8	C	..	590	.82	....	
English Electric Canberra..	A	..	570	.82*	....	With Avon jets
Republic F-84	A	..	605	.82	....	Placard speed 605 mph IAS
de Havilland Comet	C	25*	505	.80	.84	Placard speed 345 mph IAS
Lockheed F-94	C	..	595	.80	....	Placard speed 580 mph IAS; thin wing F-97 much improved
Lockheed F-80	C	..	600	.80	....	Placard speed 580 mph IAS
Hawker Sea Hawk 1	C	..	600	.80	....	
Gloster Meteor 4	C	..	590	.80	.89	Placard speed 590 mph IAS
Northrop Scorpion F-89 ...	A	..	555	.79*	....	
de Havilland Vampire 5 ...	C	..	548	.78	....	
North American B-45	A	..	550	.77	....	Placard speed 475 mph IAS
Avro Jetliner	C	..	440*	.73	.74	
Boeing B-50	P	..	380*	.70*	....	
Convair B-36A	P	15	340*	.69	.72	Without pods
Boeing Stratocruiser	P	..	373	.59	.66	Placard speed 351 mph IAS up to 13,000 ft. (M .594)
Lockheed Constellation 749	P	..	303	.54	.60	
Douglas DC-6	P	..	325	.54	.60	
Convair Liner	P	..	336	.48	.54	Placard speed 320 mph IAS up to 7,000 ft.

* Approximate

(1) Engine: A = Axial; C = Centrifugal; R = Rocket; P = Piston

(2) Mach crit — In this context is an indication of the mach number which ordinary pilots should not exceed in normal flying. This is, in general, more than the point at which buffeting starts but less than when the reactions become violent.

(3) Mach max — Mostly refers to flights made in special circumstances in excess of Mach crit during research. For civil aircraft Mach crit should be 9/10 of Mach max

stages suggest a mach number on the first row of over .82. The blades in the middle stages running at reduced loads have been forged in light alloy. Due to the temperature rise with the high compression, and about at the point where the high pressure stages start, the blade material again returns to a steel alloy. Low-pressure bleeds for turbine bearing cooling are piped within the compressor drum.

The stator casing is a magnesium casting made in halves and bolted together. The annular intake casting (also magnesium) has four hollow vanes, each suitable for carrying quill shafts to drive the accessories. The T-38 uses the vanes at 12 o'clock but the Quad would probably require the use of vanes on the outside of the square.

On the T-38 a 15:1 sun and planet reduction gear is used and the sun gear itself is conveniently located for driving accessories. The electronic propeller control consists of a regulator control arm at the propeller which transmits mechanically to a positioning indicator. A motor in the actuator then positions the regulator control arm and the input to the electronic control.

When the position of the actuator calls for operation outside the governing range the electronic control is automatically disengaged. The propeller then operates as a blade angle selection unit according to the dictates of the regulator control arm position. The electronic control compares actual engine speed recorded from the engine-driven alternator with desired engine speed indicated by the actuator.

Change of Pitch

When a speed error exists, a pitch change is called for. The pitch change is proportional to both offspeed and rate of change of offspeed thus giving both proportional and acceleration sensitivity. The rates can be varied automatically with airspeed and altitude if necessary. The pitch change is transmitted from the electronic control to a hydraulic valve in the propeller regulator. This valve controls blade angle in the constant speed range.

Synchronization of multi-engine installations is possible automatically and one or more engines of the Quad can be withdrawn from synchronization without affecting the remaining engines.

Low pressure (at the tenth stage) or high pressure tappings from the compressor for cabin pressurization are available. Bolted to the rear of the compressor casing is a short diffusor, and the fuel lines lead through bores disposed at intervals to corre-

Allison's Proposed Turbo-Quad

Output: maximum about 9,900 s.h.p. plus jet thrust (11,000 e.h.p.)
Weight (est): 4,500 lb (including four extension shafts similar to Convair T-4(installation, reduction gear, engine accessories but not including propeller, nozzle extensions or generator.)
Basic power section: diameter 20 in.; length 7 feet.
Minimum specific fuel consumption (observed by U. S. Navy): 0.63 lb/hp/hr at full throttle, static sea level.
Rotational speed: max 14,000 r.p.m.; cruising (approx) 13,500 r.p.m.; idling (approx) 4,500 r.p.m.; Reduction ratio 15:1.

Why Use A Turbo-Quad?

Two Turbo-Quads are better than four T-40s because:

1. Propeller weight is cut by nearly 50%.
2. There is better asymmetric power aircraft performance when the engines are closer to the fuselage.
3. Reduced frontal area. (The spinner is much larger than one T-38.)
4. Smoother wing shapes are possible if the outer nacelles can be eliminated.

spond with the eight combustion chambers.

Steel Alloy Chambers

These chambers are made of a steel alloy and, considering the output, are not of a large diameter. The burners and casings are parallel sided and greater attention to the flow of secondary air for cooling has been necessary owing to the close confines of the chamber.

The four-stage turbine takes all but 10% of the energy out of the gas before allowing the rest to pass out of a conventional design of tail nozzle. The turbine blades are carried on four turbine wheels each linked together, probably by a simple Hirth coupling, with provision for using the same air which cools the front face of one stage as is fed for cooling the rear face of the stage in front of it.

The drive from the main shaft through the engine is carried out into extension shafts with bearings, pressure oil fed (60 lb. pressure) and Allison has been able to use again their experience of shafting embodied in the Aerocuda and Airacobra.

Fluid Clutch

The shafts lead to a fluid connection and clutch in the reduction gear housing which allows the engines to be started one by one independently of each other and of the propeller gear. At 12,000 rpm the fluid drive will take up. In flight either engine can be shut down and the remaining engine will drive both elements of the contra-prop.

When engaging the engine it is considered best to start and accelerate it before clutching into the main drive to save wear on the clutch. The thrust bearings are in the reduction gearbox and the whole unit is contained in a light alloy casting. This component has an aluminum and magnesium base and the oil system is all part of the main supply from the pressure and scavenge pumps on the engine.

Design Trends

By Richard G. Worcester

THE TERM "supersonic propeller" is too loose to be allowed out alone. Does it mean the propeller has a supersonic tip speed or that it can propel at a supersonic forward speed. Either, neither or both are possible. We should perhaps recognize that the airfoil section, solidity, activity factor and extended range of efficiency makes the word propeller anachronic. Let us therefore admit this by using some phrase like the unducted fan (or turbo-fan engine for short) to denote the type of small span, large chord, solid steel or solid titanium blade with a double-wedge section, or "rounded double-wedge" for strength, necessary for supersonic propeller-driven aircraft.

•

What sort of engine is going to drive the fan? Let us suppose that the design improvements as outlined by R. M. Hazen of Allison for future jets are applied to the turbo-fan. We then have a low-diameter contra-rotating compressor with a pressure ratio of about 10: or 11:1 leading to an annular combustion chamber with a ceramic-lined inner surface instead of an inner lining (taking a tip from Rolls-Royce) leading to a multi-stage turbine with aircooled stators and rotors and possibly linked to a small ducted fan on one or more of the stages. From here the larger tail pipe might have after-burning for special boosting and an electronically controlled variable nozzle. Such an engine at high ram would presumably deliver about 20-25,000 hp absorbed in an unducted fan of perhaps 10-12 feet diameter. There is one conclusion from this foretaste of things to come and that is the vista of continued complication. The turbine engine is getting steadily more and not less complex. Reduced fuel consumption can come partly from this advanced design of engine and partly from a more fundamental knowledge of gas turbine technology. It is a literal fact that turbine engineers are still not unanimous in their views about how best to bend a stream of gas in the simple engines of today. Government and private companies cannot invest too much into equipment which will help technicians to gain this kind of knowledge. It is a clear case of casting your bread upon the waters.

•

Has the flying saucer got any merits aerodynamically? A geometric aspect ratio of, presumably, 1:1 could materially reduce the effects of transonic drag and it is true you can get some kind of a reasonable lift coefficient for low speed operation. But the saucer has two crippling disadvantages; first the entry is not nearly sharp enough and shock waves from the bow would impinge on the periphery—shaking the life out of it. Second, as Chance Vought found out with the Navy's Pancake project it is hard to find a place for flying controls short of using extension surfaces. An aerodynamic outwash is bound to affect the controls unless they are extended. In the yawing plane it would be next to impossible to counter asymmetric drag without using end plates and obtain a rate of yaw more than a degree or two per second. A diameter of at least 45 feet would be needed if a "fuselage" is to be avoided. There would be a large change in angle of attack with speed which is bad and the CG range would be restricted.

So, adding it up, we can say that the saucer is rather a dreary shape aerodynamically. It could be used, of course, but there are other planforms—notably the delta or even a half saucer with a sharp nose—which would be more rewarding if less revolutionary. Amen.

•

In the Aeronautical Papers, a monumental work just published, Dr. Albert Zahm contends that major credit for developing the first airplane should go to Samuel Langley rather than the Wright Brothers or Sir George Cayley. The Russians, we understand had then been flying fifty years and in 1903 were starting out on jets.

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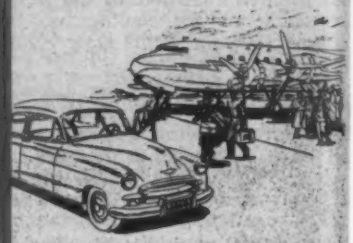

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A Pilot's Viewpoint . . .

Airport Design for Transport Operations

By WILLIAM D. PERREAULT

"IF AIRPORT planners could see these problems from a pilots' point of view . . ." If everyone could see all the problems from all the viewpoints things certainly would be different. Unfortunately it is difficult, if not impossible, for non-pilot personnel to fully appreciate the problems and hazards faced by the transport pilot in his day-to-day operations.

The next best choice, for those who fly as passengers and observers, is to combine their limited knowledge with lucid descriptions by pilots. In the past few months some 2,000 engineers, designers, airport operators and others have shared the pilot's in-flight experiences through the personal efforts of ATA's director of air navigation and traffic control, Sam Saint.

Saint

Fitting talks before the American Society of Mechanical Engineers, the Society of Automotive Engineers and the Airport Operators Council in between his duties at ATA and his piloting as a captain on American Airlines' regular routes, Saint spoke in Washington, New York and Cleveland last month. During the same period he reviewed similar problems in closed meetings with key operations personnel and others.

40 On—40 Off

The present goal, said Saint, is to move 80 airplanes per hour some 3,600 passengers, into and out of dual-runway airports when weather is thick enough to slow highway traffic. There are many bottlenecks standing in the way of this goal: enroute, during the approach, landing and immediately after landing. Within a 30 mile radius of New York's La Guardia Field there are 366 miles of airways and 38 radio fixes and intersections. During the first 10 minutes out of this field the pilot is required to change course four or five times as he makes his way out of the area.

There are 12 radio frequencies used by the control tower at New York to maintain contact with the planes and countless contacts required for each flight. The outgoing pilot is given a clearance such as: "American 389 you are cleared to the Washington Airport via Glen Cove, Great Neck, Idlewild, Riis Park, Ambrose and Green Airway Five. Cross Glen Cove 1,500, Idlewild 4,500 or above, Riis Park and Ambrose 6,000, maintain 6,000 until five minutes southwest of Ambrose, then climb to maintain 8,000. Make climb on the east side of the northeast leg of Idlewild. Traffic holding Idlewild at 3,500. Pan American from Bermuda estimating Ambrose at 6:45 at 7,000. Your departure subject to Glen Cove check from your own trip 307 off at 6:39."

Saint feels the communications load on the tower and the almost impossible pilot task of understanding and correctly interpeting such instructions must be relieved. It can be relieved through the provisions of the RTCA program for automatic, visual indicating, private-line type communications systems. Visual or picture navigation is needed to provide the pilot with a clear picture of the airport area, its airways and intersections and the related traffic problem. This will insure safer flights.

Problems In 1963

Looking ahead to 1963 Saint noted that the closing speed of airplanes, the rate of which planes will approach one another, may be greater than 700 mph. A gap of nearly two miles is closed in ten seconds. The need is growing with each step toward higher speeds and greater traffic volume.

In the same year there will be 80 planes in the air within the same

From-the-Cockpit Recommendations

As a captain flying American Airlines' routes, S. P. (Sam) Saint is authorized to fly into some 48 major airports in scheduled air transport operations. His piloting experience is enriched by his extensive work in the air navigation and traffic control fields as a member of RTCA's SC-31 Committee and in his present assignment as director of air navigation and traffic control for the Air Transport Association.

In his outspoken and well-received paper before the Airport Operator's Council at Cleveland on April 25 Saint made the following recommendations:

(1) No future terminal airport should be committed to a particular site and runway layout until CAA and ACC have approved the detailed plan as related to the general flow of traffic in the area.

(2) Airport operators should lend their weight on the side of the airline pilots and ATA to get the high intensity approach light installation program into high gear.

(3) There should be increased awareness that "all weather flying" cannot be done from runways of inadequate length or those with obstacles cluttering up the last critical half-mile leading to the airport boundary.

(4) The AOC in cooperation with CAA and ALPA should sponsor a project to install and service test a pilot-recommended system of ground reference lights to lead flights visually around the airport and into the proper runway.

(5) AOC should set up a project to persuade one or more airports like Charleston, W. Va., to install and service test the best available form of glide path indicating light. This should be coordinated with CAA and ALPA.

(6) AOC should request ALPA cooperation in running service tests of various methods of marking distance along the runway, perhaps signs every thousand feet.

(7) AOC members should be persuaded to step up the program of high intensity runway light installations.

(8) Standards for marking runway centerlines with white stripes of a given width and spacing should be adopted and the use of these markings implemented at all the airports on instrument runways.

(9) Agreement should be reached between AOC, CAA, the pilots and operators as to a standard system of marking all important intersections of runways and taxistrips and airports should then be urged to make use of the standards.

(10) AOC should persuade a major airline terminal to install and service test a visual traffic control system, work with the ALPA and other interested agencies to draw up an equipment specification and service test program and that the proposed program be submitted to the Navigation and Traffic Control Panel of ACC for coordination prior to activation.

30-mile radius of New York operating on six major airways and into five airports. Only an automatic block signal system which provides the pilot with reference data and clearances in the simple manner will make this growth possible.

Flesh and Blood

In design and in planning he said, "it should always be kept clearly in mind that an airplane is flown by a normal, ordinary flesh and blood human being. This pilot's job must be simplified. Any further increase in mental work load on the pilot must be ruled out with iron-clad determination."

Greater effort should be made to "get at the real underlying cause in our accident investigations. Too often we pin the blame on the first human we come to in working back along the tragic chain of events. This person is usually the pilot.

"Safety factor in flight is often measured by the margin between what a human pilot can do and what he is required to do. There is a dangerous tendency to have the pilot learn a new procedure to cover a weakness in equipment or system design."

Saint called for an altimeter redesigned to read like an automobile speedometer (Kollsman has one). This should eliminate the hazards of misreading present day altimeters, a suspect in numerous accident investigations. Noting that the Douglas DC-6 "stalls anywhere from 76 mph up to 132 mph depending on load, condition of flaps and angle of bank," Saint stressed that "there is only one angle to attack at which an airplane stalls under a given flap setting." Angle of attack indicators with warning alarms should be given serious consideration, he added.

10,000-Foot Runways

What are the pilot's problems as he approaches the airport? Approaching the airport on one of the designated airways, he must transfer from the airway to the local traffic control pattern. To accomplish this in the safest, most economical manner the airport must have been laid out with foresight to anticipate this need. Full utilization of the airport in future operations will depend on coordinating airport locations and design with area traffic plans through the Air Coordinating Committee, Saint explained. Failure to take this into consideration will work financial hardships on the airport operators.

The ceiling and visibility are low. Approaching the airport and watching the altimeter unwind, the pilot reviews the runway length, local obstructions (buildings, high tension lines, smoke stacks, etc.) and type of

Extra Section

By William D. Perreault

THE Pratt and Whitney R-2800 CB-16 engine which will power the Martin 4-0-4's of EAL and TWA and the Douglas DC-6B's of UAL and American, will give the airlines a sizeable bonus in performance as compared to the earlier R-2800's. While the CB-16 has the same sea-level rating as earlier models, it can maintain this 2400 horsepower up to 4,000 feet altitude. It will maintain its normal rated 1800 horsepower up to 8500 feet while present R-2800's are limited to 6000 feet at this rating.

•

Not having a plaque immediately available, we'll just have to go on record as citing CAA's contribution to the industry when it allocated money for development of the cross-wind landing gear. With Capital Airlines adopting the Goodyear Aircraft Corp's cross-wind gear design, some mention should be made of worthwhile industry-government cooperation which made the project possible. CAA is frequently criticized for its developmental projects but here is one which hit the jackpot.

•

Integral fuel tank design has been improved since the early pre-war designs were introduced and maintenance procedures have substantially improved the operation record of these tanks. None-the-less, it's interesting to note that Lockheed Aircraft Service cites 6% of its year's work as fuel tank resealing jobs. 63% of LAS's work was devoted to reconditioning and overhaul, 15% to repair, 13% to modification and 3% between conversion and line maintenance.

•

In the wing design of the Martin 4-0-4's, as scheduled for delivery to Eastern Air Lines, the outer wing will be attached to the center section by a factory splice rather than a conventional butt joint as on many of the present-day planes. This is expected to minimize maintenance by permitting the airplane to meet CAA inspection regulations without periodic wing-pulls. The outer wing will still be detachable but not in the course of periodic inspections.

•

The ball-point pen now has a scientific standing. Engineers of the Brown Instruments Division of Minneapolis Honeywell adopted the ball-point pen for a number of electronic strip chart recorders. They are being recommended for applications where measurements demand rapid pen movements across the instrument chart.

•

We note that American Airlines made a Suggestion System award to Harry Jones, a lead mechanic in AA's Tulsa instrument overhaul shop, for proposing that the plastic cover glasses on the Magnesyn test equipment be replaced with glass covers. It seems that plastic collects static electricity and distorts instrument readings. Perhaps some of the other airlines and overhaul shops are still unaware of this condition.

•

The SBAC, Britain's AIA, tells us that the hull of the Princess Flying Boat, the 140-ton 340-mph turbo-prop transport, has 3½ times the cubic capacity of the Lockheed Constellation. It's construction took two-and-one-half miles of longitudinal stringers, 1,469 square yards of metal skin and 3 million rivets.

•

Sooner or later everyone jokingly refers to the propeller as a "fan." Now Hamilton Standard is actually making 100 fan blades. The blades are being made for Cornell Aeronautical Laboratory and Southern California Cooperative Wind Tunnel for use in their wind tunnels where they will generate air flows up to approximately 900 mph. The seven-foot blades, made of solid aluminum alloy, are the widest, thickest and heaviest ever produced by Hamilton Standard. Each blade weighs over 200 pounds.

approach lights provided. The pilot needs those approach lights: The version with 25 million candle power, not the 15,000 candle power neon bars.

And long runways are needed, according to Saint. The pilot recommendation for 10,000-foot runways may "sound like asking for the moon, but . . . it is based on intimate personal experience with the most critical phase of flying operations . . . Don't brush lightly over it."

Where Is It?

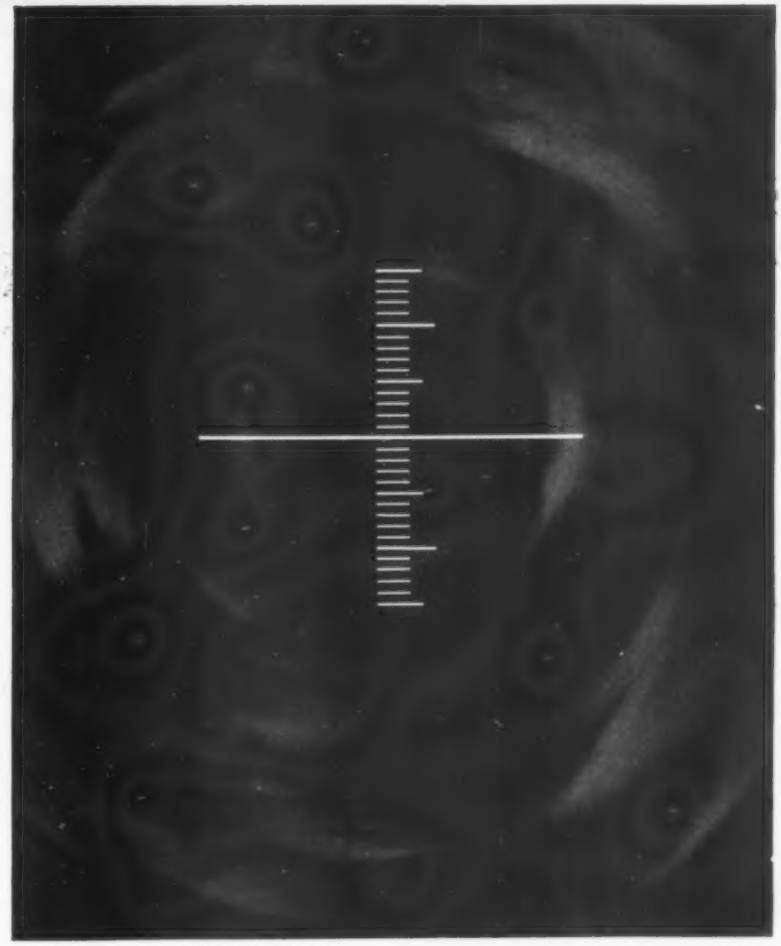
Circling the airport underneath the overcast, the ATA spokesman said, you meet a new problem face to face: "how do you find your way around the airport. The speed of turning radius of the DC-6 will not let you hug the airport boundary as you did with a Boeing 247 15 years ago. The plain truth is you—the pilot—have turned off your electronic aids of the 1950's. You are suddenly back in the horse and buggy stage of air navigation. While you call on every trick learned by experience, flying headings for so many seconds and timing turns, you search for some shred of help out the window. A highway. The neon sign on a hot dog stand. A red barn. Anything that will help to lead you around the airport and into the right runway. And you wonder why airports have not long ago been equipped with a simple set of ground reference lights to aid pilots circling an airport in poor visibility."

Saint said this need for guidance around the airport combines with the need for a visual glide path on non-instrument runways. Basic development work on such systems has shown the advisability and need but, despite ICAO recognition of the need, "little or no interest has been shown in this country."

Signs and Stripes

Finding the elusive airport and the proper runway, the pilot makes his final approach. As the plane strikes the ground "you can't see the far end of the runway. How much runway is left: Have you enough runway to get your forty tons of airplane safely stopped? You are making the most important decision of your flying career but you haven't the facts you need. Should you pull out and go around for another try." Large, clear, well-lighted distance markings are needed along the runway.

And as the airplane moves down the runway you need high intensity lights to guide your low visibility operation. There should also be white lines along the centerline of the runway. "There is not a person . . . who has not been thankful for the white line on a highway when driving in a fog. I can see no reasonable excuse why we have not, long before this,



"SIXTH SENSE" for the Automatic Pilot

The new Kollsman Altitude Controller brings positive correction to automatic piloting for the precise maintenance of a selected altitude. Weighing only twenty-five ounces, this unit combines the famous Kollsman high-precision aneroid diaphragm, the recently developed Kollsman Synchrotel and an especially designed DC magnetic clutch. Sensitivity is such that the Altitude Controller will respond to as little as a two-foot change in altitude and motivate the autopilot accordingly.

Testing now: a sister mechanism of the Altitude Controller – the Airspeed Controller, which will automatically maintain constant airspeed regardless of meteorological conditions.

Here again is demonstrated Kollsman's unrivalled leadership in aircraft instrumentation and control – especially wherein a pressure-sensitive element is the basic guide. Here is the name to be relied upon for solution of similar or allied problems in practically any industry. Inquiries invited. Address: Kollsman Instrument Division, Square D Company, 80-08 45th Avenue, Elmhurst, New York.

KOLLSMAN AIRCRAFT INSTRUMENTS

PRODUCT OF

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ELMHURST, NEW YORK • GLENDALE, CALIFORNIA

standardized on a width of line and spacing between lines and made the painting of such lines on runways universal practice."

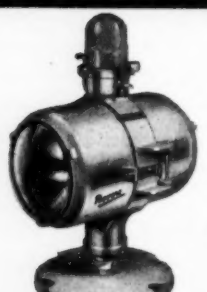
Once on the runway, he said, the pilot must get clear of the runway and onto taxi-strips as soon as possible to permit successive landings with a minimum delay. "A pilot lands a million dollars worth of airplane on several millions dollars worth of concrete on a dark rainy night. He has no such thing as a sign to help him find the turn-off taxiway." Prominent standard marking of all runway and taxiway intersections is needed.

In Chicago today, Saint estimated 68% of the airport is out of sight of the tower in a condition of one-half mile visibility. At New York International the entire ILS runway is out of sight from the tower. Controlling this traffic from the tower according to present practices is impossible under these conditions. For technological reasons radar control of traffic on the airport surface is impractical at this time.

He felt there should be coordinated effort between the AOC and the operators to install and test visual signal systems paralleling those used by the railways in order to speed the movement of aircraft after they are on the ground.

Announcing

THE LATEST IN ULTRA-HIGH INTENSITY RUNWAY MARKERS



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Technical News Digest

• **During the annual SAE meeting in New York** the Wright Brothers Medal was presented to Homer J. Wood and Frederick Dallenbach, both of AiResearch Manufacturing Co. The award, presented annually to the author of the best technical paper on aircraft design and development, recognized their paper on "Auxiliary Gas Turbines for Pneumatic Power in Aircraft Applications."

• **On April 20th the National Advisory Committee for Aeronautics** celebrated the 35th anniversary of the first meeting of the Committee. Among those present for the ceremony were Capt. H. C. Richardson, USN, NACA's first secretary, and John F. Victory, NACA's first employe and now executive secretary of NACA.

• **Aviation Maintenance Corp.** of Van Nuys, Calif., whose stockholders recently voted to dissolve the corporation, has entered into an agreement to sell its machinery, equipment, merchandise, inventories and tooling to Grand Central Airport Co. of Glendale, Calif. Grand Central will transfer some of the material to its base in Glendale and the rest to Tucson, Ariz. where it has just leased the war-time Convair plant to establish a large maintenance and overhaul facility.

• **A 20-foot plastic meteorological research ballon,** launched by New York University, was recently recovered near Myrdal, Norway, after crossing the Atlantic Ocean. The ballon crossed a major section of the U. S. in its flight from Holloman Air Force Base, Alamogordo, N. M., where it was launched. Estimated flight time was 48 hours. N. Y. U. scientists have developed a system of automatic controls which hold the plastic cells at constant altitudes during such a flight thus making it possible to determine atmospheric conditions at any desired level over long periods of time.

• **The Glenn L. Martin Co. has licensed** E. I. du Pont de Nemours & Co. to manufacture "HPM," a new flame-retardant compound for flameproofing cloth fabric and other textiles. du Pont will attempt to develop a practical method of commercial production for "HPM."

• **Under a new plan effective May 1** military pilots filing flight clearances from civil airports will transmit them to CAA rather than the MATS Flight Service Center. This will eliminate the necessity of long distance telephone messages formerly required to coordinate the flight plans. Military pilots will also make position reports to CAA when flying under VFR conditions. This will aid in search operations in the event of an emergency. CAA will transmit in flight advisory messages from the nine FSC's to the pilots.

• **F. B. Gustafson, NACA research engineer,** has been presented with the American Helicopter Society's annual award for "meritorious achievement in the field of helicopter engineering, including research and theory." Gustafson, who has been with NACA since 1938, is a member of the NACA subcommittee on helicopters and author of a number of technical reports on helicopter design.

• **During the ATA conference at Kansas City** last month Walter Kidde & Co. had on demonstration their new Navy-approved continuous, repeating fire detector. Very simple in design, the unit consists of a small tube in which two wires are imbedded in ceramic. When the temperature of the tubing is raised, the ceramic compound in which the wires are buried becomes conductive and completes the circuit for the fire warning light. A small amplifier is used to step up the signal obtained in this manner for operation of an audible alarm. The wire can be strung out through any compartment area. The circuit can be calibrated for a wide range of temperature alarm settings.

• **Kollsman Instrument Division** of Squared D Co. has announced a new lightweight, completely electric, cabin pressurization control system. The system uses three Kollsman Synchrotel instruments which measure the cabin absolute pressure, the outside altitude pressure and the relative differential.

• **Continental Air Lines has joined** the increasing number of airlines to modify their Douglas DC-3's by the adoption of the step-type door

WILCOX ...FIRST CHOICE of HAWAIIAN AIRLINES

VHF AIR-BORNE COMMUNICATIONS

Hawaiian Airlines selected the WILCOX TYPE 361A COMMUNICATIONS SYSTEM for all aircraft. This consists of a 50 watt transmitter, a high sensitivity receiver, and a compact power supply, each contained in a separate ½ ATR chassis. Transmitter and receiver contain frequency selector with provisions for 70 channels . . . ample for both present and future needs.

VHF GROUND STATION PACKAGED RADIO

Hawaiian Airlines selected the WILCOX TYPE 428A FACTORY PACKAGED STATION for all ground stations. This consists of the WILCOX 406A fixed frequency 50 watt transmitter, the WILCOX 305A fixed frequency receiver, the WILCOX 407A power supply, the WILCOX 614A VHF antenna, telephone handset, loudspeaker, desk front, typewriter well, and message rack.

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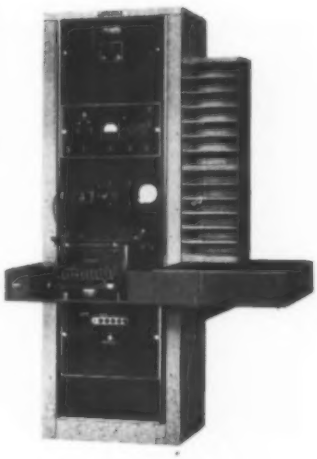
Write Today for complete information on the Type 361A VHF Air-borne Communications System and the Type 428 Packaged VHF Ground Station.



Type 428 Packaged VHF Station

WILCOX ELECTRIC COMPANY

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The Case for the C-W Flight Simulator

. . . in Airline Crew Training

Seldom is it possible to improve the end product while lowering the cost. This is exactly what the Curtiss-Wright-built Dehmel trainer has made possible in the case of flight crew training, according to Scott Flower, Pan American Airways pilot and prominent engineer. Speaking before the Society of Automotive Engineers last month, Flower presented an outstanding case for the flight simulator.

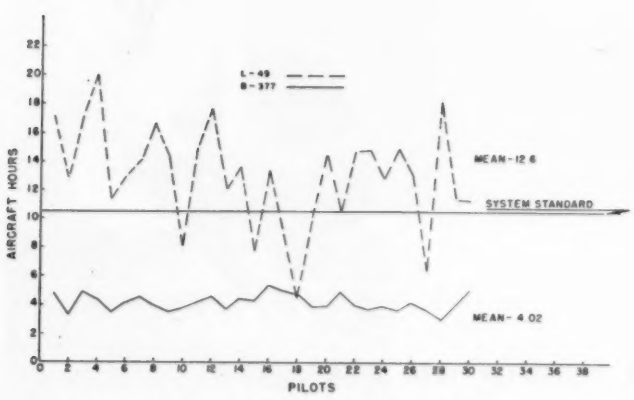
Contrary to popular impression, the simulator is not simply a device for the transition training of flight crews on new aircraft types. Flower presented proof that the airlines would gain sizable savings by the adoption of this type training unit for the recurring training which is required of flight crews.

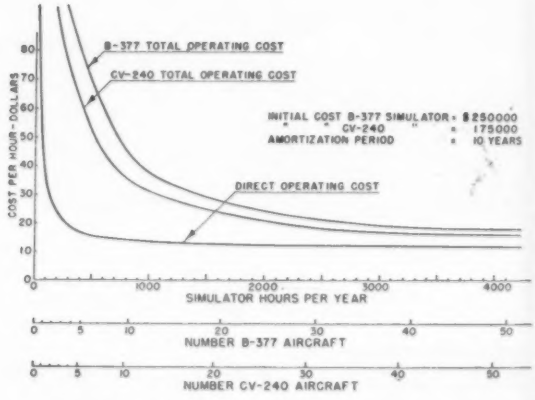
Basing his paper on a year's experience with the Dehmel trainer at PAA, Flower showed that it has been possible to reduce the flight time needed per crew for transition training from 25.2 hours which PAA experienced for the Constellation, when all training was done on the aircraft, to eight hours with the Boeing Stratocruiser when combined with simulator time.

$175,000 Annual Savings

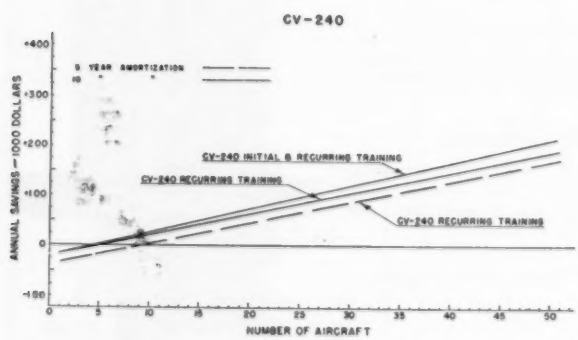
Using the Dehmel trainer for initial transition plus recurring training of the crews of 20 airplanes, PAA will save approximately $175,000 per year. This is based on amortizing the cost of the simulator over a ten-year period as provided for by CAB. It is interesting to note that Flower shows an annual saving of $125,000 when the simulator is only used for recurring training and amortization time is reduced to five years in keeping with the single task. Performing recurring training only, Flower shows that savings will result if as few as six Stratocruisers are involved.

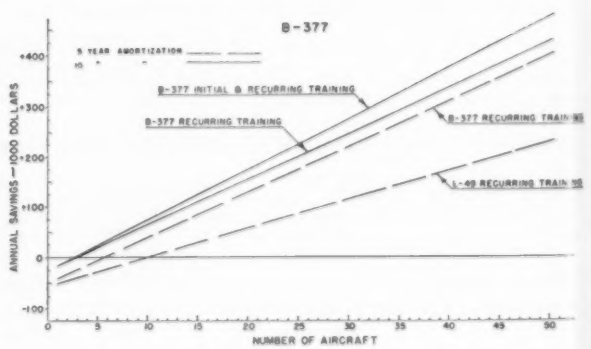
Similarly, based on a five-year amortization and an operating fleet




B-377 TOTAL OPERATING COST
CV-240 TOTAL OPERATING COST
INITIAL COST B-377 SIMULATOR = $250000
" " CV-240 = 175000
AMORTIZATION PERIOD = 10 YEARS
DIRECT OPERATING COST
COST PER HOUR-DOLLARS
SIMULATOR HOURS PER YEAR
NUMBER B-377 AIRCRAFT
NUMBER CV-240 AIRCRAFT

Sharp Contrast—These simple graphs show the sharp contrast between the time required and relative cost of training crews on the airplane only as compared to training with a flight similator plus limited time in the airplane. Note that the average number of hours in the airplane only was 12.6 hours per man and use of the simulator reduced this to 4.02 hours. Equally impressive is the leveling out of the graph showing uniform results of simulator training. In comparing the costs of simulator operation to that of the aircraft, PAA establishes the cost of operating the Boeing Stratocruiser for training purposes as $450 per hour, the Constellation as $300 per hour and the Convair Liner as $225.





Proof Positive—These graphs introduced by PAA's Scott Flower establish the annual savings which accrue through the use of the flight simulator. It is particularly interesting to note that sizeable annual savings can result even when the simulator is purchased for the sole purpose of providing crews with recurring training after initial transition training is completed. By showing that profits can be experienced when the simulator is amortized over a five-year period in recurring training only, Flower makes a strong case for building this type equipment for aircraft already in service such as the Constellation, DC-6, Convair, and Martin 2-0-2.

of 35 Lockheed L-49 Constellations, Flower proves that annual savings of about $85,000 are possible for recurring training activities only. Operators of the Constellations series will find considerable food for thought in this paper.

The analysis was extended to the third type of aircraft in use by PAA, the Convair Liner. Flower estimated that a simulator for the Convair would have an initial cost of $175,000. Based on its use for recurring training and amortization over a five-year period the stimulator could bring about annual savings of $45,000 training crews for 20 aircraft. If 30 airplanes are involved annual savings move to $90,000, etc. This reflects the high initial cost of trainers of this type.

Training Improved

The C-W Dehmel trainer has raised the standard of training which it is possible to give the flight crews by making it possible to bring about the peak hazards which can not safely be duplicated in the airplane. By "failing" artificial horizons during simulated takeoffs instructors have found that the result is often a "crash." This has stressed the danger of placing too great dependence in one instrument. Simulated fires in the engine compartments have shown weaknesses in the fire protection procedures, etc. Fire signal light confusion brought out in simulator training has caused modifications to the aircraft for improved warning indications.

Instrument Testing

Flower feels it will be an effective proving ground for new instruments such as the Sperry Zero Reader, the omni-range navigation equipment, etc. Through the use of three-dimensional pictures of landing areas coupled with airways facilities it should enable route proficiency checks and also provide for extensive training in blind approaches and landings.

The flight simulator may well open a new field of knowledge by permitting the airlines to measure the capacity of the pilot when various small operating problems are compounded to a point where the pilot's natural facilities are overreached.

In the first year of operation PAA accumulated 2,750 hours' training time on the Dehmel Trainer for a total operating time of 3,300 hours. During this time only five hours of training were cancelled because of maintenance problems and three hours of this were the result of an inverter failure. During the period the unit averaged 12 hours per day utilization and for a period of one week reached 16 hours utilization per day.

Among the Suppliers

Dr. Albert C. Hall of the Massachusetts Institute of Technology has been appointed associate technical director of **Bendix Aviation Research Laboratories in Detroit, Mich.** To expedite delivery of new floats and spare parts to seaplane users on the west coast and in Alaska, the **Edo Corporation** has established a west coast warehouse located at the Boeing Field facilities of **Washington Aircraft and Transport Co.**, Seattle, Wash., who will handle stocks and shipments for Edo.

Hall

Howard Vogel has been named to the newly created post of director of engineering for **Champion Spark Plug Co.**, Toledo, Ohio, with **Roy Paton** as his assistant. Vogel has been with Champion for 18 years and has been chief engineer since 1946 . . . **Solar Aircraft Co.**, San Diego, Calif., has appointed **Herbert K. Krumel** as manager of contract administration at its Des Moines, Ia., plant. **C. D. Oberg**, who formerly held that position, has been transferred to San Diego and will have charge of all aircraft product sales . . . **Ethyl Corporation** has moved its New York offices to 100 Park Avenue.

Minneapolis-Honewell Regulator Co. has formed a separate division within its aeronautical sales department to manage service activities across the country. **Carl A. Anderson** will be in charge of the new division . . .

Frank Ambrose Aviation Co., Flushing, L. I., N. Y., has expanded its warehouse facilities with the establishment of a branch at Miami International Airport . . . **Frederic Fladers, Inc.**, has transferred its Engineering Physics Division to the corporation's Toledo Division.

Daily Plane Utilization

International

		Jan.	Feb.
American..	4 eng. pass. ..	5:04	4:13
AOA	2 eng. pass. ..	1:25	:50
	4 eng. pass. ..	2:34	3:03
Braniff ...	2 eng. pass. ..	2:06	....
	4 eng. pass. ..	6:17	6:07
C & S	4 eng. pass. ..	8:34	8:32
Colonial ..	4 eng. pass. ..	2:47	5:40
EAL	4 eng. pass. ..	9:25	9:08
NAL	4 eng. pass. ..	7:48	8:58
	cargo	1:20	2:41
NWA	4 eng. pass. ..	6:37	7:28
Panagra ..	2 eng. pass. ..	4:02	4:05
	4 eng. pass. ..	5:31	5:35
	cargo	2:33	4:57
PAA Latin Amer. .	2 eng. pass. ..	3:20	3:34
	4 eng. pass. ..	7:28	7:23
	cargo	2:48	3:26
Atlantic..	4 eng. pass. ..	4:21	4:08
	cargo	6:21	6:15
Pacific ..	4 eng. pass. ..	4:58	5:04
Alaska ..	4 eng. pass. ..	5:56	6:48
	cargo	6:51	6:58
TWA	4 eng. pass. ..	6:27	6:28
	cargo	4:56	5:25
UAL	4 eng. pass. ..	4:56	3:38

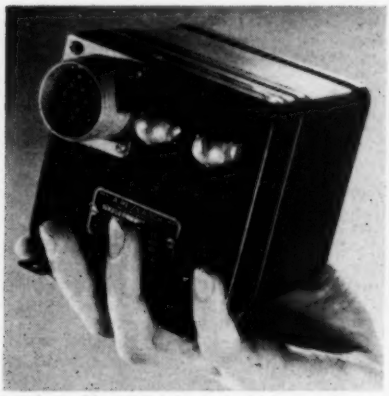
Feederlines

AAA	DC-3	4:48	4:37
Bonanza	DC-3	3:09	4:25
Central	Beech A-35 ..	2:36	3:19
Challenger ..	DC-3	5:46	5:23
Empire	DC-3	5:02	5:13
Mid-West ...	Cessna 190...	4:33	4:38
Monarch	DC-3	6:59	7:33
Piedmont ...	DC-3	6:06	6:09
Pioneer	DC-3	6:35	6:51
Robinson	DC-3	5:03	5:23
Southern ...	DC-3	6:56	6:44
Southwest ..	DC-3	5:05	5:20
Trans Texas..	DC-3	6:30	6:28
Turner	DC-3	2:28	3:14
	Bonanza	2:31	2:31
West Coast ..	DC-3	3:24	3:57
Wiggins	Cessna T-50..	1:24	2:15
Wis. Central..	Lockheed 10A	5:45	7:16

New Raider—This flight photo of the Northrop C-125 Raider shows some of the more striking changes made in the production version of the three-engine assault transport. Note that the horizontal stabilizer has been moved well up onto the newly designed vertical stabilizer. Additional dihedral has been used in the wings outboard of the nacelles and the cockpit windows have been changed for improved vision.

Electronic Regulator

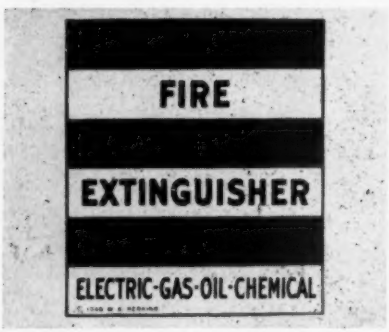
AiResearch Manufacturing Co., Los Angeles, Calif., has introduced a new, miniature electronic regulator, incorporating what is described as the first 'fail safe" circuit ever devised for remote position control. It can also be utilized for automatic temperature and pressure regulation to microscopic degrees. Approximately three inches square and weighing less than two pounds, it is a



variation of the company's previously announced "Weather Brain," but modified for more general use. The fail safe feature makes it the long-awaited answer to such aircraft applications as automatic trim tab adjustment and multi-engine throttle control, according to AiResearch engineers. In case of electric system failure, the electronic control will instantly "hold" until manual control can take over. It is suitable for such applications as carburetor and cabin air temperature control, anti-icing control and cabin pressure release control. It will meet conditions demanding variation as low as plus or minus 1%. The fail safe feature is incorporated in a potted circuit about the size of a match box. Ingenious methods of producing printed circuits, recently developed by AiResearch, make fast production of such electronic units more feasible than ever before, it was said.

Extinguisher Decals

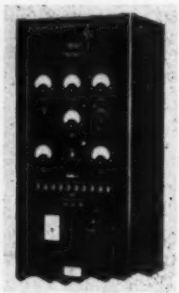
Meyercord Co., 5323 W. Lake St., Chicago 44, Ill., has developed three sets of decals for positive identification of



fire extinguishers according to the useful application of the units. The sets include an 8 x 9-inch wall decal for use above the extinguisher and a 1¾ x 2-inch decal for the extinguisher itself. The decals are coded with prominent bars of different colors and each is labeled for the type of fire on which it can be used. One decal covers wood, paper, rubbish, etc.; another electric, gas, oil or chemical and the third any type except electrical.

Alternator Tester

Schaffer Air Industries, 37-15 11th St., Long Island City 1, N. Y., has introduced the model 39 alternator test load bank designed to load test aircraft alternators with capacities to 14 kva, 3-phase 120/208 volts, 400 to 1,000 cycles. Incorporated in the test circuits are load switches for varying the applied test load, provision for applying unbalanced loads and a means of testing and checking the operation of the voltage regulators.



Other variations of the load bank include a complete variable-speed power unit for operating the alternator and a combination unit for testing both DC generators up to 600 amps capacity at 28 volts and AC alternators up to 14 kva, 3-phase, 120-208 volts, 400 to 1,000 cycles.

DC Rotary Actuator

Airborne Accessories, Corp., 25 Montgomery St., Hillside 5, N. J., has completely redesigned the "Trim Trol" elec-

tric DC rotary actuator. The new unit weighs 2¼ pounds, produces 350 inch-pounds operating torque through 180° maximum rotation and is available in two mounting styles. Static capacity exceeds 1,500 inch-pounds. Manufacturer states the Trim Trol meets all applicable aircraft specifications and incorporates zero backlash output, magnetic brake, built-in externally adjustable limit switches and potentiometer and radio noise filter. Provision for mechanical synchronizing in pairs is optional. Also available for industrial applications operating on 110 volts, AC.

Inquiries about equipment on this page may be sent either to AMERICAN AVIATION or direct to the manufacturer.

Readers looking for sources of special equipment are invited to write to AMERICAN AVIATION's equipment editor. Every effort will be made to provide information on manufacturers and suppliers who are in a position to furnish or develop needed airborne or ground equipment.

Inverter Test Stand

Greer Hydraulics, Inc., Brooklyn, N. Y., has designed a high-capacity inverter test stand, Model AI-1. This unit features balanced three-phase loading from 0 to 3,000 volt-amperes at 125 volts, 400 cycles; single-phase loading

from 0 to 2,000 volt-amps at 26 volts, 400 cycles automatic overload protection, interlocking direct current supply and cooling fan circuits and automatic overheating protection for the test stand.

Full instrumentation for test purposes is provided making it possible to run complete pre-installation and post-overhaul tests on current model inverters.

Drill Press

Sibley Machine & Foundry Corp., South Bend, Ind., is marketing a medium-weight drilling machine with a 25-inch swing. The Model E-25 has a variable-speed drive from which the exact spindle speed may be obtained for any size drill from ⅛" to 1" and an extra-large rectangular 18" by 2" table with coolant trough. It is powered by a 1½ horsepower Axial Air Gap type motor with a rated capacity of 1" in steel and 1" in cast iron. A self-locking speed control is convenient to the operator and a tachometer provides accurate reading of speeds. No belt changes are needed. Five options of spindle speeds, each with a 4-to-1 ratio, are available, ranging from a low of 206-825 rpm to a high of 540-2160 rpm with 3-phase, 60-cycle motor. A speed chart is provided on the side of the machine showing proper speeds for varying drill sizes. Total weight is 735 pounds.

Pilots demand it!
Instruments deserve it!
Safety requires it!

Pilots today are demanding an independent standby power package to insure operation of their electric flight instrument group. For they know that even the finest instruments money can buy, are reduced to dangerous liabilities when faulty power renders them useless or causes them to give incorrect indications. Eclipse-Pioneer's answer is a two-component package consisting of a lightweight ENGINE DRIVEN ALTERNATOR, and a small, panel-mounted POWER FAILURE INDICATOR. Normally, the small black face of the indicator is inconspicuous in its mounting near the gyro horizon, but if conventional power becomes faulty, a fluorescent disk instantly appears—giving the pilot approximately four minutes to switch to standby power before the gyros will precess. Two alternators are available for this system; one for electric gyro flight instruments only and the other for an electric compass as well as the flight instruments. Either one is conveniently installed on the engine vacuum pump drive pad. Here is instrument insurance that pays its own premiums—another example of the thinking that has made Eclipse-Pioneer the leader in its field.

ECLIPSE-PIONEER DIVISION OF
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Air Taxi Conference Program Shaping Up

By ERIC BRAMLEY

AN OPPORTUNITY for airline traffic and sales personnel to sell their customers on going "all the way by air" under an airline-approved plan will present itself shortly, probably sometime during June.

By that time, the National Air Taxi Conference, formed by a group of fixed base operators, expects to be doing business. It has the full approval of the Air Traffic Conference, which okayed the proposal at its Miami Beach meeting in late April. Airline managements will soon inform their traffic-sales staffs about the plan, and outline procedures to be followed.

Briefly, this is the plan: an airline passenger originating at an off-line point will be able to arrange with his local NATC member for transportation to the nearest airline stop, saving himself a lengthy trip by surface means. On his return journey, he can arrange, through the scheduled airline, to have the fixed base operator meet him at the end of his airline flight and take him home in a Bonanza, Cessna, Stinson, Piper, etc.

At the beginning, there will be 30-odd NATC members engaged in the air taxi work in 12 states, but officials of the group believe that the number will jump to 100 quickly and keep on going. Participating members will be listed in the *Official Airline Guide* starting in June. The NATC insignia, incidentally, will include a kangaroo, with the slogan, "For Short Hops."

Ticketing Procedure

As for ticketing, the following procedure has been suggested (but not yet finally adopted): a passenger originating at an off-line point will contact his NATC member, who, through a collect call, will reserve his airline space. This will be confirmed to the passenger on a "memorandum order" which he will carry with him to the airline stop, where he will turn it over to the airline and pay for his ticket. He will pay the taxi operator separately.

In the reverse direction, a different procedure is being considered. A passenger in Los Angeles desiring transportation to Newark or New York and thence to Somerville, N. J., would request the airline in Los Angeles to make arrangements for a taxi operator at the other end. The airline would handle this by teletype and collect a $10 "reservations deposit" from the passenger for the taxi operator. This would guarantee that the NATC member at Somerville would meet the flight.

If the flight could not get into Newark or New York because of weather or other operational difficulties, the $10 would be refunded. However, if the passenger changed his mind en route and decided to go to Somerville by other means, the $10 would not be refundable. This is to protect the taxi operator, who would have flown into the airline airport to meet the customer, and who would be out the cost of a round-trip.

If the flight went off as planned, and the cost of the taxi portion is more than the $10 deposit, the passenger would pay the difference to the operator. If it is less than $10, the difference would be refunded.

These arrangements, if adopted, will probably be temporary, and it is hoped that they will be superseded by a set-up under which the taxi operator will collect the whole fare at one end and the airline at the other.

Need Standard Rates

Another item that NATC officials are anxious to work out is a uniform rate for the same type of plane. As it now stands, one operator may charge 15c a mile for a Bonanza, while another charges 18c and a third collects 20c. The goal is to have one rate for one type of plane. Most NATC members have said they would have no objection to such a rate.

Whether the fixed base operators will eventually act as agents for the airlines and receive a 5% commission on the business they sell is something

National Air Taxi Operators

(Following are the National Air Taxi Conference members who are expected to start operations shortly under the NATC-Air Traffic Conference plan.)

Georgia
- Albany Air Services Inc., Municipal Airport, Albany

Iowa
- Hunter Flying Service, Hunter Airport, Cedar Rapids

Kansas
- Roscoe Charter Service, Municipal Airport, Lincoln
- Capital Air Service, Municipal Airport, Manhattan
- Roscoe Charter Service, Municipal Airport, Salina
- Capital Air Service, Municipal Airport, Topeka

Massachusetts
- East Coast Aviation Inc., Bedford Airport, Bedford
- Wiggins Airways, Logan International Airport, Boston
- Ames School of Aviation, Ames Airport, Easton
- Universal Aviation Corp., Municipal Airport, Worcester

Michigan
- Wolverine Aviation Co., Detroit City Airport, Detroit
- Hance Flying Service, Hance Airport, Wyandotte
- Wolverine Aviation Co., Willow Run Airport, Ypsilanti

New Hampshire
- Bowman Flying Service Inc., Municipal Airport, Keene
- Skyhaven Inc., Laconia Airport, Laconia

New Jersey
- Central Airport Flying Service, Central Airport, Camden
- Echelon Aeronautical Service, Echelon Airport, Haddonfield
- Red Bank Airport Inc., Red Bank Airport, Red Bank
- Somerset Air Service, Somerset Airport, Somerville
- Young's Flying Service, Wildwood Airport, Wildwood
- Young's Flying Service, Woodbine Airport, Woodbine

New York
- O'Connor Aircraft Co., Municipal Airport, Albany
- Westchester Airport Inc., Westchester (Armonk) Airport, Armonk

North Carolina
- Jacksonville Airport, Inc., Municipal Airport, Jacksonville
- Salisbury Aircraft Service, Municipal Airport, Salisbury
- Piedmont Aviation Inc., Smith-Reynolds Airport, Winston-Salem

Pennsylvania
- Wings Inc., Wings Airport, Philadelphia
- Lehigh Aircraft Co., Allentown-Bethlehem Airport, Allentown

Virginia
- Ashburn Flying Service Inc., Alexandria Airport, Alexandria
- Cavalier Aviation Inc., Byrd Airport, Richmond
- Virginia Airmotive, Woodrum Airport, Roanoke
- Woodrum Flying Service, Woodrum Airport, Roanoke

Washington
- Galvin Flying Service, Boeing Airport, Seattle

still to be decided. It has not yet been formally discussed. The first objective is to get the plan into operation and see how it works.

Knowing that they can't expect to deal with the airlines in a haphazard fashion, NATC is attempting to weld a businesslike organization. An interline agreement is being signed between the operators and the airlines, through ATC, setting forth the terms and conditions of doing business. NATC members must possess CAB letters of registration and effective CAA operating certificates, they must abide by a code of operating practices and ethics, they must carry passenger liability insurance for not less than $40,000 per seat and adequate public liability and property damage insurance, and they will each be bonded for $1,000 to provide for direct reimbursement to any airline should the NATC member involved mishandle funds.

24-Point Code

The 24-point code of operating practices and ethics has been drawn up. Among other things, operators must follow accepted principles of safe operation, check flying technique at least once every six months, dress neatly, treat the public in a courteous and friendly manner, maintain clean and orderly airport facilities, maintain clean planes, file flight plans whenever possible, and arrange ground transportation when required. The code also states: "Recognizing that air taxi service is a part of our national air transportation system, I will at all times do my best to maintain a good reputation in my community and among my colleagues to the end that air service as a whole will benefit by my participation as an air carrier."

Problems to Solve

President of NATC is Joseph Garside, fixed base operator and also president of E. W. Wiggins Airways, feederline. "There are going to be some tough problems connected with this business," he says. "For example, an airline flight may be three or four hours late, and the taxi operator will be sitting around the airport waiting. We don't know what will happen in a case like that, but we'll work it and similar problems out."

He emphasizes that the new plan won't be a gold mine either for the airlines or the operators at the outset, but he believes that after it has been in operation for a while it will mean new business for both parties. Some of the airlines, viewing the operators as new sales outlets, have already taken steps to get in touch with the NATC members in towns near their routes.

Over the Counter

Sales Promotion

NORTHWEST Airlines is distributing through its ticket offices, travel agencies and other tourist information points a comprehensive "Dude Ranch Guide" listing all the ranches along its system . . . **United Air Lines** launches a new color advertising campaign in national magazines this month, with the theme, "United Air Lines, Trademark of Fine Travel" . . . **National Airlines** has out a well-done folder on its DC-6 "Star" flights.

American Airlines, out after convention business, printed a special timetable for persons attending the recent aeronautics meeting of the Society of Automotive Engineers in New York . . . **TWA's** major sales and promotional efforts regarding tourist travel will be directed toward Athens, the Holy Land and Egypt next winter. As a longer-range objective, it plans to develop the Near East and India.

National Airlines, out after the summer business, has arranged with New York, Philadelphia, Baltimore and Washington banks so that it can offer Florida vacations under a "go now—pay later" plan. Loans can be obtained for air transportation, hotel, vacation clothes or spending money, in whatever combination the applicant desires, with the amount repayable over a year's period. The traveler can arrange his tour, plane reservation and vacation fund application in one visit to a NAL ticket office or a travel agency, and can have a check for the desired amount within 48 hours.

Aircoach

CAB said it wouldn't okay **United Air Lines'** proposed $9.95 Los Angeles-San Francisco coach service with DC-6's but would let the company start May 14 as planned if DC-4's were used. UAL accepted the change. **Western** starts with DC-4's on June 1 . . . **TWA**, scheduled to start transcontinental coach flights Apr. 30 with 80-passenger Constellations, was forced to postpone until a later date because of delays in conversion of equipment . . . **American** operated its first coach extra section out of Los Angeles on Apr. 30. Company had a 92% load factor eastbound Apr. 9-30. During the same period, AA's regular-fare schedule at a corresponding time had an 89% load factor.

Northwest Airlines has put newly-modified 66-passenger "family style" DC-4's into coach operation. With a variety of double and triple seating combinations, some of which face each other, the new planes are designed to accommodate families and other groups traveling together, the company said. NWA has added Great Falls, Mont., as a regular stop on its Seattle-New York coach flights.

Traffic

The last four airlines charging extra fares on Constellation and DC-6 equipment have filed tariffs to cancel the charges on June 1. They are **Eastern, National, Braniff** and **Delta.** EAL's extra fare on New York-Washington was dropped Apr. 30 . . . **TWA** discontinued gate passes for passengers on May 1. Boarding authority is now placed on ticket envelopes.

Braniff Airways plans to start service into Buenos Aires on its South American route on May 29, with four round-trips weekly . . . **Northwest Airlines** has started Stratocruiser service between Chicago and Seattle via Twin Cities and Spokane, one round-trip daily . . . **Western Air Lines** and **Northwest Airlines** opened service to Edmonton, Canada, on Apr. 30 . . . **Colonial Airlines** on Apr. 30 resumed daily New York-Bermuda flights and added three Washington-Bermuda round-trips. Service out of New York has been four trips weekly. Washington frequency is three weekly under the new schedules . . . **Pan American-Grace Airways** has switched all Buenos Aires operations from Moron Airport to the new Ministro Pistarini Airport.

Western Air Lines will continue to fly one trip a day between Los Angeles and Palm Springs throughout the summer. Formerly it has suspended operations May 1-Oct. 1. Flight will stop at Ontario in each direction . . . **Pan American World Airways** on May 1 put into effect its first non-stop Miami-Caracas service, and placed DC-4 sleeperette equipment on the route for the first time. Company also put Convairs on Miami-San Juan.

ERIC BRAMLEY

WAL Forms New Company For Feeder Operations

Western Air Lines and the newly-formed Western Air Lines of Pacific, Inc., have filed applications for feeder routes currently operated by Southwest Airways and West Coast Airlines. Applications were also filed seeking approval of WAL's control of the new corporation and requesting a consolidation of the proposals with the various west coast cases pending Board action.

The large-scale plan of Western Air Lines to operate over the feeder routes currently served by Southwest Airways and West Coast Airlines was disclosed recently at CAB's prehearing conference on the proposed SWA-WCA merger. The new company was incorporated April 26.

For Western and its potential subsidiary, the following possibilities were raised by the filing of these documents: (1) Western could be awarded the routes of SWA and WCA to be operated under its own name and under its own certificate; or (2) Western could operate the routes through its subsidiary. Western of Pacific, if the latter is awarded a certificate and the stock acquisition proposal approved; or (3) Western of Pacific could be awarded and could operate the routes under its present stock ownership set-up.

Since CAB has proposed in earlier show cause orders the extension of Southwest's and West Coast's certificates, the question of public convenience and necessity would apparently not be an issue. The proceeding to be proposed by Western, therefore, would not involve the question of whether airline service is needed, but which carriers should be authorized to perform it.

CAB BRIEFS

National Airlines has been authorized by CAB to suspend operations at Baltimore until the new Friendship International Airport is available in midsummer. NAL recently changed from Lodestars to DC-4 on its flights serving Baltimore, and the present airport was deemed not adequate for the larger equipment.

The Board has issued an exempton to **Carco Air Service**, a small irregular carrier, authorizing air transportation of persons and property between Albuquerque, Santa Fe and Los Alamos, N. W., for a one-year period, subject to the condition that local traffic will not be carried between Albuquerque and Santa Fe.

Braniff Airways' complaint against an additional daily DC-6 schedule started by **American Airlines** between Dallas and Chicago on April 1 was dismissed by the CAB, which said Braniff had failed to show that the new schedule would not be an economical operation for American. Braniff may renew its complaint at a later date if experience proves the operation of such schedules to be an unfair method of competition.

The CAB has authorized **Pan American World Airways** to suspend operations at Midway Island until June 30, 1951. Withdrawal of personnel and facilities of the Navy and the CAA from the island, now nearly completed, has removed the need for a continuation of operations by PAA.

United Air Lines' $9.95 plus tax Los Angeles-San Francisco air coach tariff was approved by the Board, over the objections of **Western Air Lines**, on condition that DC-4 equipment be substituted for the DC-6's proposed in the tariff filing.

Delta Air Lines has applied to CAB for an extension of its Route 24 from the intermediate point Shreveport to Oklahoma City. The two cities are 298 miles apart and are not served on a direct basis by any airline at present.

CAB CALENDAR

May 15—(Docket 3645 et al.) Oral argument before the Board in South Texas Service Case (applications of Val-Air Lines, Inc. and Trans-Texas Airways). 10 a. m., Room 5042, Commerce Building, Washington.

May 15—(Docket 4435) Prehearing conference in investigation of Braniff Airways round-trip excursion fares. 10 a. m., Room C-116, Temporary Building 5, Washington. Examiner Paul N. Pfeiffer.

May 17—(Docket 4211) Hearing on application of American Airlines, Inc. for all-cargo route authority (Los Angeles, San Francisco, et al.) 10 a. m., Room 214, Wing "E", Temporary Building 5, Washington. Examiner Walter W. Bryan.

May 18—(Docket 3965 et al.) Oral argument before the Board in Parks Investigation Case. 10 a. m., Room 5042, Commerce Building, Washington.

May 22—(Docket 2036 et al.) Prehearing conference in Kenai Peninsula Service Case. 10 a. m., CAB Office, Loussac-Sogn Building, Anchorage, Alaska.

June 1—(Docket 4319) Hearing in CAB investigation of operations in air transportation of Metropolitan Air Freight Depot, Inc. Tentative. Examiner Walter W. Bryan.

June 5—(Docket 4344) Hearing on application for approval of an agreement between Transocean Air Lines and Loftleider, H. F., calling for, inter alia, lease Transocean aircraft and utilization of Transocean personnel. Tentative. Examiner Walter W. Bryan.

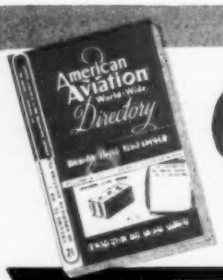
June 5—(Docket 4161) Hearing resumed in Enforcement Proceeding against Trans American Airways, Inc., Great Lakes Airlines, Inc., Golden Airways, Inc., Edward Ware Tabor and Sky Coach Airtravel, Inc. 10 a. m., Room 406, U. S. Post Office Building, 641 Washington Street, New York City. Examiner Barron Fredricks.

June 5—(Docket 2824 et al.) Hearing in Florida-Bahamas Service Case. Tentative.

June 8—(Docket 2849 et al.) Hearing in Big Four Mail Rate Case. Tentative.

June 8—(Docket 4296) Hearing in CAB investigation of operations in air transportation of American Shippers, Inc. Tentative. Examiner H. K. Bryan.

June 12—(Docket 2019 et al.) Hearing in Reopened Additional California-Nevada Service Case. Tentative. Examiner F. Merritt Ruhlen.



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Schedule E reports showing officers' and directors' salaries and stockholdings and amounts over $10,000 paid for legal and other services during 1949 have been filed with CAB by the following carriers:

American Airlines, Inc. & Consolidated Subsidiary

C. R. Smith, pres. and dir., $50,000 salary (down $10,000), 2,000 shares common, 2,000 shares beneficially, and 20 shares preferred; O. M. Mosier, v. p. and dir., $27,500 salary (up $2,500), and 4,500 shares common; R. E. S. Deichler, v. p., $27,500 (up $4,166.79), 100 shares common, and 10 shares preferred; L. G. Fritz, v. p., $27,500 (up $3,333.43), and 400 shares common; William J. Hogan, v. p. and treas., $27,500 (up $4,166.80), and no shares; William Littlewood, v. p., $27,500 (up $2,500), 5,000 shares common, 3,520 shares beneficially, and 10 shares preferred; C. W. Jacob, v. p. and sec'y, $22,500 (up $3,166.71), 20 shares preferred; Rex W. D. Smith, Jr., v. p., $21,250 (up $2,083.45), and no shares; Amos Culbert, v. p., $20,000 salary, and 1,000 shares common; Glenn E. Markt, ass't v. p.,[1] $9,429.64 salary, and 200 shares common; W. H. Miller, ass't v. p., $18,000 (up $333.38), 670 shares common, and 200 shares beneficially; Carlene Roberts, ass't v. p., $14,250 (up $2,250), and 100 shares common; C. R. Speers, Jr., ass't v. p., $16,500 (up $3,661.23), 400 shares common, and 350 shares beneficially; P. G. Larie, comptroller and ass't treas., $16,000 (up $533.43), and 200 shares common; V. J. Long, ass't sec'y and ass't treas., $13,500 salary, 50 shares common, and 10 shares preferred; W. L. McMillen, ass't sec'y and ass't treas., $13,100 (up $1,766.74), 220 shares common, and 30 shares preferred; T. O. English, ass't treas., $10,200 ($3,450), and no shares; L. E. Glasgow, ass't comptroller and ass't treas.,[2] $10,578.51, and no shares; C. H. Kibbee, ass't treas.,[3] $14,300 (up $1,100), and no shares; A. A. Paradis, ass't sec'y, $7,500 (up $833.43), and no shares; A. R. Bone, Jr., regional v. p., $11,869.29 (up $1,369.36), 1,000 shares common, and 55 shares preferred; W. N. Bump, regional v. p., $11,500 (up $750.13), and no shares; Walter Johnson, regional v. p., $11,000 (up $3,306.40), and no shares; Stanley G. King, regional v. p., $12,000 (up $9,822.96), 250 shares common, and 25 shares preferred; M. D. Miller, regional v. p., $12,750 (up $1,250.07), 500 shares common, 30 shares preferred, and 900 shares beneficially; R. S. Damon,[4] $27,096.78 (down $12,903.22), and no shares; J. G. Zevely,[5] $5,000 (down $6,988.48), and no shares; Walter Sternberg,[6] $10,527.76 (down $2,649.17), and no shares; George C. Van Nostrand,[7] $10,700 (down $1,300), and no shares; Harold T. Ames, dir., $900, 3,000 shares common, 2,000 shares beneficially, and 100 shares preferred; H. E. Benedict, dir., $1,000, 2,100 shares common; James Bruce, dir., $200, and 1,100 shares common, beneficially; E. H. Butler, dir., $600 (down $100), and 1,250 shares common; Amon G. Carter, dir., $800 (up $400), and 66,800 shares common; C. S. Cheston, dir., $1,100 (down $500), 2,400 shares common; T. M. Conroy, dir., $1,100 (up $100), 200 shares common, and 500 shares beneficially; Silliman Evans, dir., $500 (down $100), and 500 shares common; John W. Farley, dir., $500 (down 300), and 200 shares common, beneficially; Charles T. Fisher, dir., $800 (down $500), 1,000 shares common; Thomas S. Hammond, dir., $900 (up $700), 50 shares common, and 100 shares preferred; A. N. Kemp, dir., $400 (down $800), 2,500 shares common; Robert W. Miller, dir., $400, and 100 shares common; Edgar M. Queeny, dir., $700 (up $200), 15,000 shares common, and 800 shares preferred.

[1] Elected vice president March 20, 1949.
[2] Elected assistant comptroller and assistant treasurer, November 16, 1949.
[3] Resigned November 30, 1949.
[4] Resigned January 19, 1949.
[5] Resigned May 31, 1949.
[6] Resigned September 6, 1949.
[7] Resigned November 1, 1949.

Ammon & Whitney, consultant engineers	$ 35,190.00
Chadbourne, Wallace, Parke & Whiteside, legal services	20,505.76
Covington, Burling, Rublee, Obrien & Shorb, legal services	79,150.00
Debevoise, Plimpton & McLean, general counsel	110,000.00
Arthur Young & Co., accountants & auditors	30,000.00

Bonanza Air Lines, Inc.

Edmund Converse, pres. and dir., $6,000 salary, 16,095 shares common, and 7,322 shares preferred; Wesley Durston, v. p. and dir., no salary, 15,550 shares common, and 13,006 shares preferred; Lawrence G. McNeil, dir., no salary, 1,000 common; Morely Griswold, dir., no salary, 2,500 common; Florence J. Murphy, sec'y-treas. and director, $3,408.94 salary, and no shares.

Capital Airlines, Inc.

J. H. Carmichael, pres. and dir., $35,000 salary (up $7,499.96), and 437 shares common; R. G. Lochiel, v. p. and treas.-dir., $23,500 (up $3,134.98), and 235 shares, 2,000 series A and B 4% debentures; J. W. Austin, v. p., $18,000 (up $1,125), and 100 shares; J. B. Franklin, v. p., $18,000 (up $2,250), and no shares; R. J. Wilson, v. p., $17,760 (up $1,200), and 36 shares; Hayes Dever, sec'y, $14,000 (up $1,125.08), and 100 shares; R. P. Wright, ass't treas., $10,875 (up $1,175), and no shares; C. H. Murchison, chrm. exec. comm. and dir., $15,000 (up $15,000), and 1,000 shares; Robert F. Black, dir. (resigned September 13, 1949); J. C. Herbert Bryant, dir. (resigned October 20, 1949); H. B. Clark, dir., no salary and 200 shares common; W. V. Couchman, dir., no salary, and 610* series A and B 4% debentures; D. L. Frawley, dir., 1,020 shares common; D. F. Gruenhagen, dir., no salary and no shares; George R. Hann, dir., 5,100 shares, 175,500 series A and B 4% debentures; C. T. Johnson, Jr., dir., 100 shares; A. F. Kroeger, dir., 100 shares; George W. Mason, dir., (resigned September 13, 1949); C. Bedell Monro, dir., no salary, and 12,500 series A and B 4% debentures; B. D. McIntyre, dir., no salary and no shares; T. D. Neelands, Jr., dir., 25,000 series A and B 4% debentures; H. J. Reeves, dir., 500 shares, 40,000 series A and B 4% debentures; J. R. Stockton, dir., no salary and no shares.

* Couchman owns a 2% interest in Cohu & Co. which owns $30,500 each of the Series A and Series B 4% debentures.

Lehman Brothers, New York, N. Y., corporate refinancing, 1949, $62,900.

Lybrand, Ross Bros. and Montgomery, Pittsburgh, Pa., certified public accountants, 1949, $22,222.69.

Stockton, Ulmer and Murchison, Jacksonville, Fla., legal, corporate, tax matters and CAB route proceedings, 1949, $60,000.

Trundle Engineering Corp., Cleveland, Ohio, company survey, June 13, 1949—July 29, 1949, $10,000.

Caribbean Atlantic Airlines, Inc.

Dionisio Trigo, pres., $10,000 salary, 22,731 common shares; Benigno Trigo, v.p., $3,500 salary (up $2,486.77), and 22,731 shares; Manuel Sanchez Rivera, v.p.-traffic, $5,400 (down $1,500), and 198 shares; Frank Sheldon, v.p.-traffic, $2,100, and no shares; Jose M. Sierra, v.p.-oper., $10,000 (up $700), and one share; Adolfo Valdes, sec'y, $1,500 (up $1,070.83), and no shares; L. A. Lockhart, treas., $7,200 (up $300), and 251 shares.

—Airline People—

ADMINISTRATIVE

John C. Leslie, a veteran of 21 years' service with Pan American World Airways and a vice president since 1945, has been appointed vice president-administration, succeeding the late Howard B. Dean. Vice President **Erwin Balluder,** who joined Pan American in Mexico in 1930 and has been vice president in charge of Latin American affairs since 1946, was appointed deputy to Leslie and in his absence will act in his stead.

Richard S. Maurer, secretary and general counsel of Chicago and Southern Air Lines for the past four years, has been elected vice president and general counsel of the company and retains the position of secretary. He served on the general counsel's staff of the Civil Aeronautics Board before joining C&S as assistant to the general counsel in in the fall of 1943.

Maurer

Richard A. Miller, formerly with Trans World Airline for five years, has been elected vice president and treasurer of Resort Airlines. He will supervise the administrative functions of the airline.

—OPERATIONS-MAINTENANCE—

J. S. Pitisci, general foreman of engine overhaul for Eastern Air Lines for the past two years, has been promoted to superintendent of engine overhaul. He has been with the company 21 years.

Stanley R. Shatto, vice president of maintenance and engineering of Western Air Lines, has been given the added responsibility of the flight operations department and given the new title of vice president of operations.

Capt. D. R. Petty, United Air Lines' eastern flight operations manager in Denver, has been named flight manager for the company at Los Angeles, replacing **Capt. T. S. Jobson,** who has returned to active flying duty at his own request. **Capt. Frank Crismon,** western flight operations manager in Denver, has taken over Petty's former duties in addition to his own.

Petty

W. E. Golden has been appointed to the newly created post of chief station

(Turn to Page 42)

Airline Commentary

By Eric Bramley

ONE OF THE real lovable guys in this airline business is C. E. Woolman, president and general manager of Delta Air Lines. "C. E.," as he is known throughout the industry, celebrated his 25th anniversary with Delta and predecessor companies on May 1. Some days previous to this, Delta's personnel director had asked him for an okay on purchasing a 25-year pin with a larger-than-usual diamond in it. C. E. turned him down with the comment that the only fellow coming up with a 25th anniversary was Woolman and they weren't going to spend any money on him. On May 1, he was called to the Delta hangar in Atlanta and was surprised to see practically all the company's Atlanta personnel assembled. A mechanic started the ceremonies by saying that C. E. had turned down a diamond for himself, so the mechanics had made him a pin in the shops—it was a Delta pin with about a six-inch wingspread and a large piece of airport granite in the middle. Next, a stewardess informed him that the Delta folks had planned to take up a collection to buy him a silver service. She showed him a picture of the service, but added that he wasn't going to get it because too much money had come in and they decided to buy something else. The "something else," it turned out, was to be "mechanical." This was the cue, and in through the hangar door, with horn blowing, came a blue Cadillac, which was duly presented to the speechless president. Miami was the only place on the system where the employees could find the Cadillac they wanted, so a crew chief drove the car all night to get it to Atlanta in time. He reported his progress en route and the messages were put on the Delta teletype in code to keep the system informed. The car arrived in Atlanta 20 minutes before the ceremony. It was a great tribute to a great guy.

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We quote, without comment, the following Associated Press dispatch, datelined Roanoke, Va., as it appeared in the Kansas City Times: "Dr. Douglas Southall Freeman, the noted historian, came to Roanoke today to address a meeting of 600 railroad employees. He told the railroad men that competing airlines are subsidized. Railroads, he declared, are the victims 'of the worst discrimination of which the United States has been guilty.' What's more, he added, railroads are safer than airplanes. As soon as Dr. Freeman finished he excused himself. He had to get to the airport to catch an airplane."

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We've had answers from both sides on the items of three issues ago on tipping at airports—about how passengers are still blackjacked into having their bags carried a few feet to a counter, how porters are making big money from tips, how some reforms are still needed, etc. Stephen Sayles, a porter at Chicago, writes and says that he had read the article "and being a redcap and having worked for the airlines for 12 years and I make the wonderful salary of $140 a month plus less than $50 a month in tips, it is about time that someone bursted that myth bubble about tips that you say that we make. I have never made anything like that $500 that you stated in your article. I have never held out the well-known hand for a tip in my life until the tip was offered. I have never been reported for being nasty to any passenger in any way. I think that is a fine record. Of course there are some fellows that get a bit out of line, but you find that in all walks of life, even in editors, I guess." If Mr. Sayles has never had his hand out, we congratulate him, and agree that he has a fine record, but in our travels we have found many of his colleagues who don't measure up. Less than $50 a month in tips is low, and we don't know enough about his working conditions at Chicago to comment. On the other side, comes a wire and a letter from a gentleman whose name we won't disclose for the time being. "Congratulations on your tipping at airports story . . . You hit a real sore spot in airport operations," he says. In the following letter, he adds: "Some of our porters up here are driving around in 1950 Cadillac convertibles. It really is a good job . . .." Anyone else care to be heard?

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manager for National Airlines, in charge of station planning and training. He joined NAL in 1943 and has been West Palm Beach station manager. **J. D. Tilford,** formerly station manager at Marianna, takes over Golden's old post.

Herbert Drew, formerly station manager for National Airlines at Baltimore, has been transferred to head the Tallahassee station, while **Russell E. Pence,** former station manager at Valdosta, has been named station manager at Key West.

C. L. Bennett has been named maintenance assistant to the vice president-operations of Transocean Air Lines. He joined TAL in 1948 and before that had served with Aviation Maintenance Corp., Consolidated Vultee Aircraft and United Air Lines.

TRAFFIC & SALES

Roger F. Burkhardt, eastern regional manager of reservations and ticket offices for American Airlines for the past six years, has been named system director of reservations and ticket offices. He succeeds **R. W. King,** who resigned to become general traffic manager of Eastern Air Lines.

Arthur C. Smith, formerly cargo traffic manager, and **M. E. Sullivan,** formerly manager of rates and tariffs, have been promoted to the new positions of director of sales administration and director of traffic, respectively, of Western Air Lines. Among those reporting to the new sales director will be **Mrs. T. B. MacDuff,** manager of the administrative procedures section, a new post.

Robert Brass, formerly traffic manager of the Olympic Shipping Co., Brooklyn, has joined the sales department of Seaboard & Western Airlines.

Charles P. Ware, formerly with American Airlines for eight years as a sales representative in New England and the maritime provinces of Canada, has joined National Airlines as a sales representative in the West Palm Beach area.

Bernard B. Burns has been promoted to senior sales representative for Trans World Airline at Washington, while **Phils Deslauriers** has been promoted from city freight agent to sales representative. **Russell Ellis,** senior sales representative formerly in charge of cargo, has been assigned to government and military accounts.

James Mayer, formerly with Chicago and Southern Air Lines at Toledo and Detroit, has been named sales manager for The Flying Tiger Line at Toledo; **William Grant** has been transferred from the Boston sales office to be sales manager at Akron-Canton, and **William Davis** has been named station manager at the latter point.

Slosson E. Viau has been promoted from assistant sales manager of the Los Angeles district to advertising production manager of Western Air Lines.

thanks C&S!

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American Aviation

The Air Industry's Pioneer Independent Magazine — MARCH 28-29, 1950

Ten Million Bucks—Plus

S.S.

SID STEWART

In This Issue

Ten Million Bucks..... Cover
Meeting Agenda..... Page 2
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Meeting Notes..... Page 3
Page 4

HERE'S WHY . . . American Aviation has always been privileged to enjoy a unique relationship with the aviation industry. We *believe in* it—and fight for it. Our primary aim has always been to serve it in the most constructive ways we know how.

So when Chicago & Southern Air Lines used our magazine format for its annual sales meeting at Memphis, March 28-29, we were pleased—naturally. Few trade papers in any industry ever receive such a tribute.

In place of the lead editorial by W.W.P., appeared a sales message by S.S.—Sid Stewart, president of C. & S. In the usual photo spot was Stewart's photo. On Page 2 was the program for the sales meeting. On Page 3 was Eric Bramley's "Airline Commentary" but ghosted for this occasion by someone in the C. & S. organization.

Last year Braniff Airways used the format of Official Airline Guide for its sales program. And the Management Club of TWA at Kansas City used our magazine format to announce one of its meetings. Our vest buttons have been popping—naturally.

C&S thanks Mr. Wayne W. Parrish, Editor and Publisher of American Aviation Publications for permission to reproduce the cover of "American Aviation", the most widely-read publication in the aviation industry. Further thanks is given for his kind permission to "swap" his initials which identify his front-page editorials, for those of Sid Stewart, whose thoughts are shown on this special "American Aviation-C&S Spring Sales Meeting Program."

BUT C. & S., what we appreciated most of all was the box on the bottom of Page 2 of your program. We hope you'll excuse us for underlining nine important words. Thanks to all of you on C. & S. all the way from Chicago to Caracas. More sales to you!

American Aviation

U. S. Domestic Airline Traffic for February, 1950

Airlines	Revenue Passengers	Revenue Passenger Miles	Available Seat Miles	Passenger Load Factor %	Mail Ton-Miles**	Express Ton-Miles	Freight Ton-Miles	Total Ton-Miles Rev. Traffic	Available Ton-Miles Flown	% Available Ton-Miles Used	Revenue Plane-Miles	Scheduled Miles	% Scheduled Miles Completed
American	193,741	96,663,000	171,733,000	56.29	721,397	437,348	2,194,661	12,914,718	23,014,683	56.12	4,040,394	4,184,862	95.01
Braniff	42,836	14,364,000	29,191,000	49.21	87,458	63,889	96,564	1,624,307	3,769,635	43.09	868,954	867,029	97.89
Capital	76,606	23,445,000	52,661,000	44.52	102,286	138,086	530,022	3,014,971	6,636,686	45.43	1,444,280	1,444,181	93.31
Caribbean	6,691	545,000	1,136,000	47.98	617	. . .	2,215	46,676	97,014	48.13	44,691	46,243	95.93
C & S	20,261	7,291,000	14,618,000	49.88	41,694	38,063	50,832	830,684	1,703,996	48.75	534,707	553,797	95.13
Colonial	9,914	2,701,000	5,530,000	48.84	6,633	4,214	6,197	289,191	840,854	34.39	193,014	223,216	85.80
Continental	12,215	4,303,000	11,716,000	36.73	13,856	6,156	26,719	459,380	1,220,561	37.64	417,866	416,920	99.21
Delta	44,354	22,328,000	38,878,000	57.88	92,939	58,075	182,731	2,494,055	5,153,123	48.40	1,138,766	1,159,916	96.63
Eastern	182,943	100,297,000	157,233,000	63.79	389,194	291,980	1,065,426	12,218,821	22,509,131	54.28	4,203,694	4,120,885	95.80
Hawaiian	22,123	2,897,000	4,407,000	65.74	4,083	9,215	28,808	291,423	488,087	59.71	199,707	170,864	97.28
Inland*	5,803	2,128,000	4,126,000	51.58	7,659	3,664	8,222	223,613	417,201	53.60	216,742	217,168	99.80
NCA	24,189	7,085,000	13,382,000	52.94	23,699	15,812	27,759	746,963	1,529,359	48.84	637,233	636,440	98.52
National	35,997	24,273,000	39,656,000	61.21	62,031	54,545	199,644	2,791,489	5,300,320	52.67	997,154	930,663	96.61
Northeast	16,043	3,010,000	7,081,000	42.51	7,782	10,029	11,321	308,401	714,863	43.14	221,277	252,712	84.28
Northwest	46,724	26,400,000	60,425,000	43.69	212,415	110,901	366,012	3,283,376	7,321,594	44.85	1,462,919	1,507,388	95.07
Trans Pac.	3,225	385,000	974,000	39.53	. . .	36	882	32,290	94,993	33.99	39,157	32,198	98.57
TWA	84,854	54,448,000	109,715,000	49.63	603,583	344,470	768,343	6,945,984	14,470,235	48.00	3,194,038	3,372,943	93.39
United	129,074	73,334,000	139,106,000	52.72	790,697	533,713	1,571,392	9,928,182	21,661,338	45.83	3,730,130	3,900,098	94.51
Western*	34,048	12,220,000	25,358,000	48.19	53,693	32,102	41,062	1,294,790	2,644,261	48.97	626,480	571,592	96.94
TOTALS	991,641	478,117,000	886,626,000	53.92	3,221,676	2,152,298	7,178,814	59,739,314	119,587,934	49.95	24,201,203	24,611,115	95.06

* Operations of Western and its subsidiary, Inland, should be considered as consolidated, although reports are filed separately as shown here.
** Includes air parcel post.

U. S. Feeder Airline Revenues & Expenses for January, 1950

Airlines	Total Operating Revenues	Passenger Revenues	Mail Revenues	Express Revenues	Freight Revenues	Excess Baggage Revenues	Non-Scheduled Transport Rev.	Total Operating Expenses	Aircraft Operating Expenses	Ground & Indirect Expenses	Net Operating Income
All American	$ 151,171	$ 42,317	$ 105,851	$ 2,451	$ . . .	$ -13	$ . . .	$ 248,979	$ 123,656	$ 125,323	$ -97,808
Bonanza	63,443	20,315	42,520	50	150	. . .	408	60,698	27,968	32,730	2,745
Central	47,455	2,069	45,157	. . .	. . .	. . .	. . .	45,654	17,491	28,163	1,801
Challenger	85,926	20,378	63,711	841	1,190	201	. . .	100,296	48,829	51,467	-14,370
Empire	71,282	20,530	49,991	504	. . .	192	391	79,920	36,979	42,941	-8,638
Mid-West	45,804	2,793	42,995	. . .	. . .	14	. . .	43,578	24,902	18,676	2,226
Monarch	118,368	23,074	91,432	434	1,903	92	916	134,081	70,166	63,915	-15,713
Piedmont	199,112	80,550	111,571	1,200	1,249	690	. . .	212,025	118,407	93,618	-12,913
Pioneer	269,033	112,870	143,887	1,149	2,421	827	3,098	242,735	121,831	120,904	26,298
Robinson	53,380	27,972	24,650	115	555	109	. . .	100,828	53,177	47,651	-47,448
Southern	208,305	14,351	192,752	682	. . .	90	. . .	129,726	70,630	59,096	78,579
Southwest	144,725	58,867	80,447	990	2,643	451	584	169,690	76,630	93,060	-24,966
Trans-Texas	179,616	36,307	141,225	954	759	331	. . .	210,780	110,649	100,131	-13,164
Turner	18,205	2,821	13,556	142	. . .	29	1,658	28,331	12,606	15,725	-10,126
West Coast	69,597	18,829	49,558	258	. . .	64	. . .	95,023	43,355	51,668	-25,426
Wiggins	9,009	407	8,603	. . .	. . .	. . .	. . .	15,731	7,732	7,999	-6,722
Wis. Central	104,004	19,288	83,784	897	. . .	96	. . .	131,043	65,502	65,541	-27,038
TOTALS	1,838,435	503,738	1,291,290	10,267	10,870	3,173	7,055	2,049,118	1,030,510	1,018,608	-210,683
					Helicopter	Mail Service					
Hel.Air Service	32,462	. . . .	32,447	. . .	. . .	. . .	. . .	24,302	12,776	11,526	8,160
Los Angeles	34,382	. . . .	34,382	. . .	. . .	. . .	. . .	35,458	23,595	11,863	-1,075

NOTE: Figures are taken from monthly reports filed by the airlines with CAB. The data are tentative and subject to later change.

U. S. Feeder Airline Traffic for February, 1950

Airlines	Revenue Passengers	Revenue Passenger Miles	Available Seat Miles	Passenger Load Factor %	Mail Ton Miles	Express Ton-Miles	Freight Ton-Miles	Total Ton-Miles Rev. Traffic	Available Ton-Miles Flown	% Available Ton-Miles Used	Revenue Plane-Miles	Scheduled Miles	% Scheduled Miles Completed
All American	5,469	762,000	3,855,000	19.79	2,738	5,025	. . .	82,403	440,556	18.70	183,582	226,100	81.18
Bonanza	1,121	293,000	1,367,000	21.40	359	60	517	30,317	138,469	21.89	69,396	70,896	97.88
Central	377	42,000	382,000	10.99	1,378	. . .	. . .	5,434	36,777	14.78	127,256	149,408	84.97
Challenger	1,526	431,000	1,830,000	23.55	2,086	1,900	2,700	49,986	195,795	25.53	91,493	94,192	96.36
Empire	3,032	534,000	1,713,000	31.16	1,307	817	. . .	53,168	168,999	31.46	81,563	84,336	96.71
Mid-West	454	65,000	424,000	15.33	1,225	. . .	. . .	6,596	46,610	14.15	105,931	136,640	77.52
Monarch	1,846	513,000	2,550,000	20.12	1,880	1,528	5,814	60,741	238,555	25.46	141,709	146,496	94.25
Piedmont	5,805	1,213,000	4,876,000	24.88	3,085	3,626	6,574	129,287	557,278	23.20	232,199	247,016	93.40
Pioneer	7,986	2,215,000	6,945,000	31.89	7,336	2,542	7,521	240,067	690,225	34.78	287,594	285,768	99.17
Robinson	2,743	421,000	1,405,000	29.96	1,331	1,992	1,624	40,450	161,726	25.01	73,244	87,676	82.71
Southern	1,770	307,000	2,776,000	11.06	2,497	1,918	. . .	33,675	252,610	13.33	133,163	139,370	95.55
Southwest	6,243	1,120,000	3,675,000	30.48	3,353	2,237	9,526	127,538	367,654	34.69	174,990	179,144	97.68
Trans-Texas	3,218	718,000	4,713,000	15.23	3,845	2,130	4,014	82,015	310,925	26.38	224,429	229,768	97.66
Turner	694	304,000	1,028,000	29.59	287	393	. . .	26,836	91,919	29.20	66,786	69,288	73.61
West Coast	3,316	465,000	1,800,000	25.83	648	624	. . .	44,064	162,759	27.07	85,707	90,832	94.36
Wiggins	114	12,000	102,000	11.76	106	. . .	. . .	1,148	10,114	11.35	25,485	42,952	59.33
Wis. Central	2,925	457,000	1,251,000	36.53	2,240	2,193	. . .	47,272	129,430	36.52	155,533	167,160	93.04
TOTALS	48,639	9,872,000	40,692,000	21.80	35,701	26,585	38,290	1,060,997	4,000,401	26.50	2,260,060	2,447,042	91.25
						Helicopter	Mail Service						
HAS	. . .	. . . .	. . . .	. . .	688	. . .	. . .	688	2,343	29.36	22,004	24,960	88.12
Los Angeles	. . .	. . . .	. . . .	. . .	2,825	. . .	. . .	2,825	8,831	31.99	22,761	26,976	84.38

U. S. International Airline Revenues & Expenses for January

Airlines	Total Operating Revenues	Passenger Revenues	U. S. Mail Revenues	Foreign Mail Revenues	Express Revenues	Freight Revenues	Excess Baggage Revenues	Non-Scheduled Transport Rev.	Total Operating Expenses	Aircraft Operating Expenses	Ground & Indirect Expenses	Net Operating Income
American	$ 331,107	$ 283,370	$ 8,244	$ 5,850	$ 341	$ 20,270	$ 4,371	$	$ 321,233	$ 170,865	$ 150,368	$ 9,874
Amer. O'Seas	1,285,955	743,370	329,143	88,994	99,683	. . . .	8,714	10,986	1,767,926	944,332	823,594	-481,971
Braniff	351,920	197,326	138,951	2,795	. . . .	7,452	6,461	. . . .	376,006	184,029	191,977	-24,086
C & S	316,387	187,516	128,362	1,274	. . . .	12,185	6,833	. . . .	312,912	165,629	167,283	3,475
Colonial	50,505	32,296	17,302	176	. . . .	346	34	. . . .	99,064	45,639	53,425	-48,559
Eastern	82,779	72,662	2,888	. . . .	. . . .	6,384	844	. . . .	67,700	31,549	36,151	15,079
National	111,576	113,187	-9,623	. . . .	5,913	. . . .	2,099	. . . .	139,660	59,699	79,961	-28,084
Northwest	901,570	316,327	446,351	22,000	1,302	115,320	2,540	. . . .	884,713	438,597	446,116	16,857
Panagra	1,186,665	682,524	342,570	57,253	71,020	. . . .	28,743	. . . .	1,069,458	511,890	557,568	117,207
Pan American												
Latin Amer.	4,999,697	2,999,513	1,161,286*	134,695	543,727	. . . .	94,697	24,661	4,876,347	2,164,000	2,712,347	123,350
Atlantic	3,470,034	1,274,280	1,788,688*	156,982	215,493	. . . .	35,370	. . . .	3,932,131	2,196,605	1,735,526	-462,097
Pacific	2,881,093	1,055,004	1,541,612*	97,488	159,350	. . . .	11,154	. . . .	2,662,299	1,449,048	1,213,251	218,794
Alaska	397,295	142,833	197,470*	. . . .	54,924	. . . .	1,331	. . . .	370,923	179,666	191,257	26,372
TWA	2,445,659	1,170,597	760,942	260,837	. . . .	181,727	40,578	2,574	2,663,782	1,388,572	1,275,210	-218,122
United	275,490	209,707	35,519	. . . .	. . . .	10,485	1,132	. . . .	446,001	261,589	184,412	-170,511
TOTALS	19,107,732	9,480,322	6,889,005	828,344	1,151,153	354,169	244,901	38,221	20,010,155	10,191,709	9,818,446	-902,422
					Figures for Panagra for November, 1949							
Panagra	1,285,976	781,869	311,449	47,964	76,540	. . . .	45,483	6,917	1,214,291	600,445	613,845	71,685

* Represents company's estimate of amount which should be received in accordance with the terms of the Civil Aeronautics Act when permanent rates are established. Estimate exceeds temporary rates in effect by: Latin American Div. $782,436; Atlantic Div. $979,597; Pacific Div. $561,212; Alaska Div. $94,954

NOTE: Data in above tabulations were compiled by American Aviation Publications from reports filed by the airlines with the Civil Aeronautics Board. Figures for American Airlines include that carrier's service to Mexico but not to Canada; for Braniff to South America; C & S to South America; Colonial to Bermuda; Eastern to Puerto Rico; National to Havana; Northwest to Orient and Honolulu, and United to Honolulu. Operations of U.S. carriers into Canada are included in domestic reports to CAB, in accordance with CAB filing procedures.

U. S. All-Cargo Airline Revenues & Expenses

Airlines	Total Operating Revenues	Passenger Revenues	Mail Revenues	Express Revenues	Freight Revenues	Excess Baggage Revenues	Non-Scheduled Transport Rev.	Total Operating Expenses	Aircraft Operating Expenses	Ground & Indirect Expenses	Net Operating Income
					October, 1949						
Flying Tiger	$ 324,901	$	$	$	$ 148,512	$	$ 176,110	$ 290,875	$ 190,684	$ 100,191	$ 34,026
Slick	373,878	. . . .	. . . .	. . . .	342,926	. . . .	. . . .	421,658	233,807	187,851	-47,780
U.S. Airlines	18,343	. . . .	. . . .	. . . .	16,811	. . . .	1,575	50,383	29,837	20,546	-32,040
TOTALS	717,122	. . . .	. . . .	. . . .	508,249	. . . .	177,685	762,916	454,328	308,588	-45,794
					November, 1949						
Flying Tiger	323,351	. . . .	. . . .	. . . .	197,096	. . . .	126,988	317,856	221,698	96,158	5,495
Slick	402,463	. . . .	. . . .	. . . .	380,852	. . . .	. . . .	430,350	229,038	201,312	-27,887
U.S. Airlines	28,350	. . . .	. . . .	. . . .	20,518	. . . .	6,331	60,318	34,544	25,774	-31,969
TOTALS	754,164	. . . .	. . . .	. . . .	598,466	. . . .	133,319	808,524	485,280	323,244	-54,361
					Figures for Quarter Ending December 31, 1949						
Flying Tiger	755,420	. . . .	. . . .	. . . .	562,899	. . . .	10,585	702,953	439,897	263,056	52,467
Slick	1,195,215	. . . .	. . . .	. . . .	1,120,222	. . . .	6,111	1,311,231	734,418	576,813	-116,016
U.S. Airlines	101,551	. . . .	. . . .	. . . .	69,708	. . . .	29,567	214,510	101,579	112,931	-112,959
TOTALS	2,052,186	. . . .	. . . .	. . . .	1,752,829	. . . .	46,263	2,228,694	1,275,894	955,800	-176,508

NOTE: Air News began certificated operations December 14, 1949, but figures are not yet available.
Flying Tiger began certificated operations October 17, 1949.
Slick Airways began certificated operations September 21, 1949, but figures covering September operations are not available.
U.S. Airlines began certificated operations October 1, 1949.

U. S. All-Cargo Airline Balance Sheet Data as of Dec. 31, 1949

Airlines	Total Assets	Current Assets	Investments & Special Funds	Operating Prop. & Equipment	Deferred Charges	Current Liabilities	Long-Term Debt	Deferred Credits	Operating Reserves	Capital Stock	Surplus
ing Tiger	$ 2,170,468	$ 809,975	$ 2,869	$ 1,328,387	$ 29,237	$ 604,709	$	$ 1,951	$ 92,987	$ 761,227	$ 709,594
ick	2,206,339	1,301,501	. . . .	694,613	210,226	872,565	1,306,000	12,729	. . . .	1,808,150	-1,793,105
S. Airlines	612,547	381,298	50,009	69,635	111,604	75,728	. . . .	1,786	8,155	1,900,000	-973,122
TALS	4,989,354	2,492,774	52,878	2,092,635	350,067	1,553,002	1,306,000	16,466	101,142	4,069,377	-2,056,633

NOTE: Air News began certificated operations December 14, 1949, but figures are not yet available.
Flying Tiger began certificated operations October 17, 1949.
Slick Airways began certificated operations September 21, 1949.
U.S. Airlines began certificated operations October 1, 1949.

The Birdmen's Perch

If you wonder why we're always harping on *safety*, take a gander at some conclusions drawn from a recent CAB analysis of 850 air accidents in 1948:

In private planes, 9 out of 10 fatal crashes are due to pilot error. Nearly half of these mistakes result from recklessness.

The study, concerned with the "human equation" in flying mishaps involving planes other than commercial air carriers, blamed pilots for 758 of the fatal crashes in which 1268 persons were killed.

They found that 3 out of 4 crashes resulted from one of three types of errors: reckless flying; loss of adequate flying speed; and flying into weather which blanked out the ground.

Does that answer your question?

And Speaking of Being Careful...

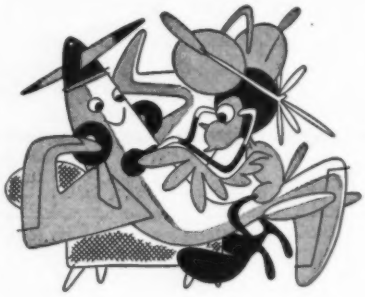
A power of otherwise peerless pilots figure there's no real difference in aviation motor oils.

Well, they're the same sad-faced flyboys you'll see hangin' round the hangar, always waiting for their ships to be overhauled, always sobbing about sticky valves and rings.

Sure they got troubles, but we got the answer and it's as simple as *A B G!*

*A*lways *B*uy *G*ulfpride Aviation Oil—Series D—and you've taken a mighty wise precaution for plane-happy flying.

Gulfpride Aviation Oil—Series D—is the world's finest detergent dispersant oil for horizontally opposed engines, the only light-plane oil put through Gulf's exclusive Alchlor process to remove extra carbon and sludge formers.



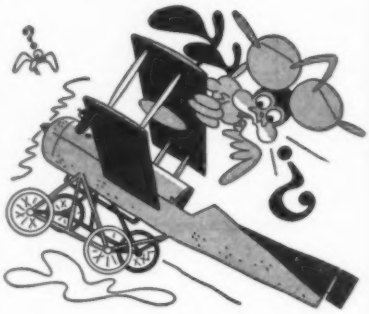
Try it and increase those periods between overhauls up to 100%.

Little Known Facts Dept.

Stand back, please, he needs air! We mean Russell Schmude of Oshkosh, Wis., who hit the jackpot with this astounding Little Known Fact About Well Known Planes, submitted with overwhelming proof!

"The Bug," a pilotless plane which was the forerunner of the German V-1, was developed by the U.S. in 1917—but never used, although it flew successfully on four test flights.

OUCH! Well, anyway, felicitations, Russ, my boy! Your Commission of Perch Pilot (bottom rung, naturally) is on the way.



Take heed, Chappies, or you'll be saluting him soon. Lest that happen, why not shoot for your own Commissions!

Don't remain unsung forever! Send your Little Known Facts About Well Known Planes—With PROOF—to this address:

GULF AVIATION DEPT., GULF BUILDING PITTSBURGH 30, PA.

Gulf Oil Corporation . . . Gulf Refining Company . . . marketers of

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AVIATION PRODUCTS

AIRPORTS
Including Features Formerly in AIRPORTS AND AIR CARRIERS Magazine

Design to End Ramp Servicing Confusion

By KEITH SAUNDERS

AT CHICAGO, busiest of the nation's commercial airports, Charles E. Haneline, Chicago manager of ground station services for United Air Lines, has had ample opportunity to observe the shortcomings and the objectionable features of present-day procedures and facilities employed in the loading, unloading and servicing of airline planes and the handling of airline passengers and cargo.

At the Cleveland meeting of the Airport Operators Council, Haneline presented the results of his study in the form of a proposed air terminal building which he felt would solve these problems.

He has heard pilots "beef" about the nightmarish business of trying to maneuver a plane through the bee-hive-like maze of fuel trucks, ground power units, cargo and food units, and personnel pushing various and sundry stands about on the ramp.

He has seen planes damaged and personnel injured as a result of the ramp congestion and consequent high exposure to accidents.

He has noted employe grievances and airline passenger complaints about the annoyances, inconveniences and hazards of propeller blasts, icing and other conditions resulting from exposure to the elements of wind, weather and ramp traffic.

He has seen baggage damaged on occasion from exposure to rain, snow and extremes in temperature, and on other occasions has seen flights held up when baggage carts conveying baggage from one plane to another have encountered heavy traffic on the ramp.

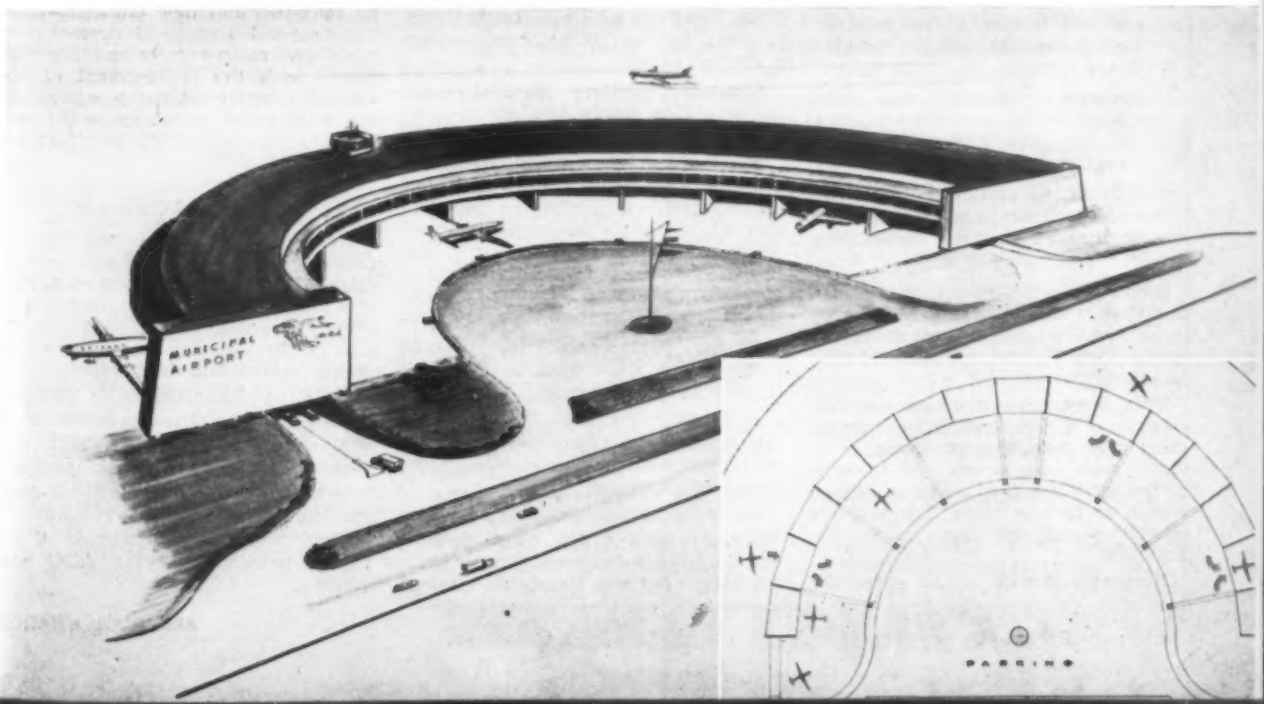
Pointing out that simultaneous handling of three or more four-engined aircraft by one airline is not an uncommon occurrence, Haneline briefly described the handling procedures in such cases as a means of emphasizing the problems involved.

Many Servicing Units

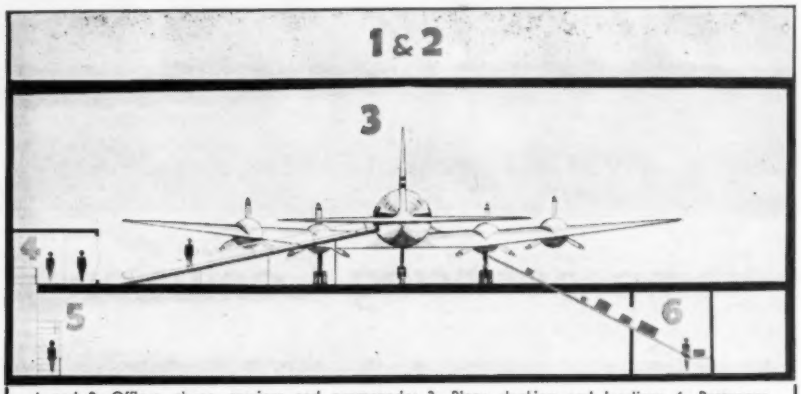
Three men, he said, are required to guide, signal and spot the three planes at the gates, and a minimum of two more are required to watch for wing tip clearance and to assist the signal man. The three signal men then have to obtain ground power units and affix them to the planes, usually through the use of tractors. Six men, two for each stand, are required to push out and position the passenger steps.

A minimum of four gasoline trucks and one oil truck with a total of nine men maneuver into position. Three drivers of mobile conveyors or lifts maneuver to the nose cargo door, while three drivers of tractor trains pull into position to receive cargo and baggage. Three drivers of air conditioning units pull up and make connections while another driver tries to find an opening in the traffic through which to pull the waste disposal unit.

In addition to the vehicles listed above, the average traffic converging upon each plane, Haneline said, is as



Servicing Ease—Airline terminal design proposed by Charles E. Haneline, United Air Lines, to end the clutter of servicing trucks on airport ramps by bringing the aircraft to permanent servicing facilities in a sheltered loading position.



1 and 2. Offices, shops, services and promenade; 3. Plane docking and loading; 4. Passenger check-in and waiting; 5. Entrance foyer for check-in and waiting; 6. Baggage and cargo receiving.

Underground Servicing—The airplane shown in this artist's drawing of Charles E. Haneline's proposed "ideal" terminal arrangement is docked at grade level, while all servicing facilities such as fueling, air conditioning, sewage disposal, water and electricity are handled from the basement level beneath the plane.

follows: food service transporting vehicle, mail and express tractor and train, air freight tractor and train, local boarding baggage cart, transfer-cargo transporting vehicle, water tank and tractor, crew car, and food loading and unloading lift truck.

What Can Be Done

After observing all these conditions at Chicago and at other airports, Haneline reached these conclusions:

1. Congestion and excessive requirements for mobile equipment are caused by having to take facilities to the airplane instead of bringing the airplane to the facilities.
2. Fixed facilities would eliminate a major portion of the hazards and materially reduce maintenance costs.
3. Passenger comfort and employes' working conditions can be improved only by undercover docking.
4. Fueling, a major hazard and work problem, can be solved by undercover and/or under-wing one point fueling.

Based on these conclusions, Haneline then worked out a general plan for a terminal building that, in his opinion, would establish an ideal condition.

This theoretical terminal has two floors and a basement. Planes would enter the terminal at grade level under their own power and leave it in the same manner, being positioned within extremely close tolerances by simple raised curbing inside the building.

Servicing trucks would enter the building via ramps leading to the basement, where fuel lines and other service facilities would be located in fixed positions beneath the plane docks. Offices, shops and promenades might occupy a second floor, although actually it could be dispensed with since adequate ticketing and lobby space could be provided between parked planes.

According to Haneline, a terminal of this type would:

Eliminate fuel and oil trucks by use of pipe lines in the basement.

Eliminate ground power units by installation of rectifiers and floor plugs.

Eliminate mobile air conditioners by centralizing the source or by making fixed installations under each plane and making connections through the floor if air conditioning is needed at all.

Eliminate sanitary disposal units by providing sewer and water connections in the floor.

Eliminate the numerous carts, conveyances and tractors used for cargo loading and transporting by installation of a simple conveyor system, which could easily be extended for transportation of baggage and cargo between airlines and from planes to the field post office and express office.

Enable replacements of present ramps with hydraulically or electrically operated ramps.

And, perhaps most important of all, **minimize the weather problems** to passengers, employes, equipment, cargo and baggage.

Haneline emphasized that his paper made no attempt to place responsibility for present conditions or their correction but was simply an attempt to bring into focus certain factors which have not in the past had adequate consideration.

He also stressed that he had no intention of presenting a technical cost study of the types of facilities needed, although he thought it proper to point out some cost factors to be considered in such planning.

"Very often the industry is prone to consider only the immediate cost of a single unit without considering all factors for the long term," the UAL official said. "Very often also this action has been justified because of uncertainties of location, equipment changes and lack of uniformity of methods, all of which must be given their proper weight in arriving at a decision.

Urges Unified Planning

"However, these very facts in themselves should point out the necessity for unified planning between airport operators and air transport operators, and should lend weight to as much standardization of facilities and stabilization of thinking as is possible between locations in various parts of the country. This seems to be essential in order to encourage the development of one-purpose facilities specifically designed to overcome some of the present difficulties."

He said major items to be considered in any cost comparison should be initial cost of equipment, maintenance and depreciation of equipment, effect of equipment on manpower requirements, quality of the results produced, and intangible or hidden costs.

Haneline said it is recognized that all the facilities now in use throughout the country cannot summarily be scrapped and new ones provided, but "careful timing of present terminal and ramp repairs and improvements with the replacement of obsolete or worn-out ramp equipment could do much to minimize the cost of obtaining many of the features described."

Facilities Available

He said underground facilities for fueling, starting engines and sewage disposal could be obtained at almost any large airport by this plan, and at other cities where new terminals are still in the planning stage any or all of his ideas could be adopted.

Haneline joined United in 1931, became assistant to the director of work analysis in 1941 and in 1944 was named manager of work analysis, which position he held until his present appointment in 1948. His was one of the most widely discussed of the papers presented at the AOC convention.

Revised National Airport Plan Lists 5,093 Projects

The fourth annual revision of the National Airport Plan, a three-year forecast of airport construction or development projects, lists 5,093 locations at which airports should be built or approved starting in the next three years.

CAA has estimated the program will cost $928,033,000. Copies of the plan may be obtained from the GPO at 75c per copy.

CAA Airport Grant Offers

For the four weeks ended March 31, the Civil Aeronautics Administration made Federal-aid grant offers totaling $3,914,857 to 49 communities, as follows, with classes in parentheses:

California: Garberville Airport (1), $35,989.

Florida: Miami International (6), $30,000.

Georgia: Atlanta (Fulton County Airport) (3), $63,200.

Hawaii: Hana Airport (3), $94,000.

Idaho: Friedman Airport, Hailey (3), $21,801.

Illinois: Charleston Mattoon (3), $215,000; Vermillion Co. Airport, Danville (3), $250,000.

Indiana: Evansville Municipal (5), $57,000.

Iowa: Clarinda Mun. (1), $3,450; Clinton Mun. (3), $6,332; Des Moines Mun. (4), $83,930; Davenport Mun. (4), $21,000; Keokuk Mun. (3), $6,950.

Kansas: Emporia Mun. (3), $1,750; Horton Mun. (1), $2,800.

Massachusetts: New Bedford Mun. (4), $49,172.

Michigan: Wayne-Major Airport, Detroit (6), $334,200, $32,600 and $452,500.

Minnesota: Little Falls Mun. (2), $17,400.

Missouri: Joplin Mun. (3), $6,000; Springfield Mun. (4), $16,000.

Montana: Circle Airport (1), $1,499; Kalispell-Flathead Co. Airport (3), $20,066; Miles City (4), $22,697.

Nebraska: Lincoln Mun. (6), $19,885.

New Hampshire: Laconia Mun. (2), $7,000.

New Mexico: Crews Field, Raton (3), $4,079.

New York: Broome Field, Binghamton (4), $104,613; Clarence Hancock Airport, Syracuse (4), $49,000.

North Carolina: Hickory Mun. (3), $225,450.

North Dakota: Hector Field, Fargo (4), $200,000; Grand Forks Mun. (4), $19,000; New Rockford Mun. (2), $5,500; Wishek Mun. (1), $1,700.

Ohio: Cleveland Mun. (5), $350,000.

Oklahoma: Bristow Mun. (1), $23,259; Medicine Park, Lawton (1), $10,854; Tishomingo Airpark (1), $7,900.

Oregon: Bend Mun. (2), $8,048; Cascade Emergency Airport (1), $3,970.

Pennsylvania: Harrisburg, State Airport (4), $13,000.

Tennessee: Paris-Henery Co. Airport (2), $475; Tom Stewart Airport, Union City (1), $45 000.

Texas: Anderson Field, El Paso (5), $4,500 (4) $6,000; Gregg Co. Airport, Longview (4), $275.

Utah: Moab Airport (2), $8,798.

Washington: Cashmere-Dryden (1), $4,515.

Wisconsin: Clintonville (3), $50,000; Mitchell Field, Milwaukee (6), $600,000; Burnett Co. Airport, Siren (3), $22,000.

These boosted to 1,212 the total of grant offers made under the Federal Airport Program, and increased the Federal funds involved to $105,-273,406.

Airport News Digest

• **Establishment of a City Airport Commission** has been approved by the voters of Davenport, Iowa. The Commission will manage the Municipal Airport at Mt. Joy and Cram Field inside the city limits and will have its own budget, containing levies for airport purposes.

• **The New Orleans Airport Commission has decided** to expand the city's lake front airport into a major terminal comparable in most respects to Moisant International. The overall expansion program, which will cost $5,000, will include lengthening of runways to 7,500 feet. It is expected that much of the $800,000 in oil lease rentals and bonuses acquired by the city will be spent on the improvements.

• **Baltimore's new $15,000,000 Friendship International** Airport will be formally dedicated on June 24 and will be open to scheduled airline traffic in early July. The dedication ceremonies will be spread over a nine-day period, with different events scheduled each day to entertain visitors.

• **The Philadelphia City Council was being** urged to finance a $5,000,000 loan for construction of an adequate terminal building and other improvements at Philadelphia International Airport. Bids on the terminal were in excess of available funds and could be withdrawn if not acted upon by May 15.

• **Airport improvement projects costing $235,000** are due to be started within about 30 days at Gowen Field, Boise. Involved are reconstruction of the administration building and moving of the control tower.

• **The Texas Air National Guard is scheduled to** move from Ellington Air Force Base back to Houston Municipal Airport by fall. Careful plans are being laid for ensuring the safety of the combined military-commercial operations at the field.

• **An improvement program costing** $75,000 to $100,000 has been started at Salt Lake City Airport. Work will include fencing, a new control tower, runway lighting and apron paving.

• **City of Houston has awarded to Electronics** Devices Company a concession to install coin-operated telescopes and "listening posts" at Municipal Airport. The city will get 30% of the gross revenues.

• **Efforts of the Town of Stratford (Conn.)** to collect taxes on the Bridgeport Municipal Airport are being fought by the City of Bridgeport, which has instituted suit requesting a judgment that the taxes sought to be collected are not legally due and owing.

• **Gibbs Municipal Airport will become** Montgomery Field in an official rededication ceremony the week end of May 20 and 21 at San Diego.

• **Contracts to carry out the final phase** of the $500,000 improvement program at Joplin (Mo.) Municipal Airport have been approved.

• **A friendly test case brought to** determine whether the City of Greenville, (S. C.) may legally issue $225,000 in general obligation bonds for an improvement program at the Municipal Airport has resulted in a decree in favor of the city.

• **The Metropolitan Airports Commission at** Minneapolis/St. Paul has tentatively chosen a 1,600-acre site about 11 miles of Minneapolis in connection with its planning to meet future air terminal needs of the Twin Cities. As soon as a final decision is made, it is planned to build a Class III secondary airport, capable of expansion to Class IV size or larger.

• **The Massachusetts legislative committee on aeronautics** is expected to recommend state purchase of the $3,500,000 Barnes Airport at Westfield at a price of $250,000. Most of the money in the field came from the federal government.

• **Construction of a new hangar** and new control tower is about to start at San Fernando Valley Airport, Los Angeles, with a total cost of $52,882.

• **The next meeting of the Airports Advisory Committee** of CAA will be held in Miami June 4-9.

• **The new Heber Valley Airport** in Wasatch County, Utah, is to be dedicated May 30. The Heber Valley Flying Service operates the field.

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More Old-Timers

In the round-up of airport managers with the longest service, published in the May 15 issue, *American Aviation* left out quite by inadvertence one of the best airport managers in the country and one with almost the longest record.

He is Arthur E. Thomas, manager of Des Moines Municipal Airport, who took over the airport in August, 1925. Thomas had served in the Navy in

Arthur E. Thomas

World War I and went to work for the city of Des Moines in 1922. When the government abandoned operation of the air mail fields in 1925 he was transferred to the engineering department to prepare plans and supervise construction of the first city-operated airport. He became first manager and has been in the same post for a quarter of a century.

Jack Berry of Cleveland outranks Thomas by a few months.

Another old-timer has come to light in the meantime. He is Frank O'Neal, operator and owner of the O'Neal Airport at Vincennes, Ind. O'Neal started an airport south of the city in 1925 and moved to his present location across the river from town a few years later. He's managed to last out depressions and recessions because he built a swimming pool, tavern and a flying club to supplement his aviation income. By all of the available records O'Neal ranks near the top of the list.

Airport People

Vice Adm. John W. Reeves, Jr., who retired from the Navy this month after 43 years of service, has been named general manager of Los Angeles International Airport at a salary of $15,000 yearly.

Merle W. Hemphill, former chief of airports in the Civil Aeronautics Administration's Third Region at Chicago, has been appointed as deputy director of CAA's Office of Airports in Washington.

Dr. Milton Ure Clauser, who has been associated with Douglas Aircraft Company the last 13 years and now is chief of the mechanical and equipment section of its El Segundo plant in California, has been appointed professor of aeronautical engineering and head of the School of Aeronautics at Purdue University, effective next August 1. He will succeed **Prof. Elmer F. Bruhn**, who has requested that he be relieved of his administrative duties in order to devote all his time to teaching, research and writing.

Earl D. Prudden, vice president of Ryan Aeronautical, Inc., has been appointed to the California Aeronautics Commission, to succeed **David G. Fleet**, who recently resigned.

Douglas A. Carr has resigned as assistant manager of Sky Harbor Airport, Phoenix, to accept a position with the Union Oil Company in that city. He had held the airport job three years.

L. S. Cox, Jr., operator of Owensboro (Ky.) Aviation, was elected manager of the new $900,000 Owensboro-Daviess County Airport, succeeding **Don Mitchell**, resigned. Cox was manager of the old airport east of Owensboro in the early 1940's.

Clyde G. Sharrer, formerly assistant manager of the El Paso Airport, has been appointed director of aviation for Midland, Texas.

Airport Management--Exacting Job

Airport management today is an exacting profession, but you'd never guess it from looking at an airport manager's salary check.

This was brought out in a study of airport managers made by the Parks College of Aeronautical Technology and the Bureau of Business & Economic Research of St. Louis University.

Purpose of the survey was to find out: (1) What are the academic qualifications of an airport manager; (2) what kind of previous experience is useful in the position, and (3) what salaries are being paid in the position.

Questionnaires went out to managers of all U. S. airports of Class III size and larger that are also scheduled airline stops—400 in all—and 130 replies were received. The answers provide a picture of airport managers as they see themselves.

Pilot Ticket Helps

Of those answering, 25% said they considered a pilot's license a necessary qualification for airport managers, 67% thought it desirable, and 8% deemed it undesirable. Of those considering a pilot's license necessary or desirable, 37% recommended a private pilot's license and 54% thought a commercial ticket more desirable. Military aviation experience was considered desirable by 66% of those answering, undesirable by 32% and necessary by 2%.

On the point of college or university degrees, 12% thought a business degree necessary, 87% thought it desirable, and 2% undesirable, while 82% thought a degree in engineering a desirable qualification for the job, 16% thought it undesirable, and only 2% thought it necessary.

Courses of study considered most necessary for airport managers were, in order, public relations, personnel management, lighting systems, runway construction and maintenance, drainage and erosion, public speaking and accounting. Courses considered most desirable, but not necessary, were advertising, statistics, marketing, industrial relations, merchandising, building layout and design, surveying and soil mechanics.

Broad Schooling

Leaders among courses they had studied before their employment as airport managers were: personnel management (69%); public speaking (67%); accounting (61%); economics (56%); public relations (56%), and principles of salesmanship (53%). Principal courses covered by airport managers since their employment in that capacity were listed as: lighting systems (45%); runway construction and maintenance (41%); drainage and erosion (32%); building layout and design (25%); and soil mechanics (25%).

The average annual wage of the airport managers answering the questionnaire was stated to be $4,690, with only 39 managers reporting salaries in excess of $5,000. Another 30 were in the $4,000 to $4,999 bracket, and 29 were in the $3,000 to $3,999 bracket. The average annual starting salary for the group was $3,480.

Only 53 of the airport managers reported that they had assistant managers, and virtually all of those had been employed since the war. Average starting salary for the assistants was $3,010, and the present average salary $3,820.

The answers were received from airport managers in 39 states.

Lightplane Production 64% Above Prewar

By B. J. WARD

LIGHTPLANE SHIPMENTS for 1949 and the first four months of 1950 indicate that the steep drop in sales of 1947 and 1948 has been arrested. The business is showing signs of returning health, at a level 64% above the last normal prewar year.

1938 was the last "normal" prewar year before inauguration of CPTP and WTS, and 1948 can be considered the first "normal" postwar year in that, by that time, aircraft production for the GI flight training program had filled the demand and, once again, it was the private aircraft facing an unsubsidized civilian market.

According to figures of the Aircraft Industries Association, the years up to 1938 show a fairly steady increase in total lightplane production. By 1948, as compared with 1938, business flying had increased 1,400%, pleasure flying had increased 600%, commercial flying (non-scheduled charter, cargo, etc.) had increased 400% and flight instruction had increased, 1,500% in hours flown. Viewed from 1938, the lightplane business looks sound.

One Distortion

Flight instruction remains the only distorted value in the lightplane business, since it still consists approximately 50% of GI flight training. However, this proportion is shrinking: approximately 31,899 GI flight students were among the 49,575 student pilot certificates registered by CAA in 1949.

January, 1950, saw 1,696 GI students approved for flight training and a total of 2,995 CAA student pilot certificates issued; February of this year had 1,404 GI students approved for flight training and 2,848 CAA student pilot certificates issued. While GI flight training comprised about three-fourths of all flight training in 1948-1949, the ratio is shrinking and now is about 50%. July 25, 1951, remains the cut-off date for starting GI courses.

CAA reports that in April, 1950, about 20 flight schools folded up—and this may be conservative. On the basis of student pilot certificates issued in the first two months of 1950, non-GI student pilots for this year will total about 15,480 compared with 15,376 in 1949 and 15,556 in 1938.

Flight training is the one phase of private flying which does not show a substantial increase over the prewar expansion figure. It is critical because it remains the dominant source of income to private flying. In 1948 it accounted for 57% of all private and non-scheduled flying time.

Flight Training Drops

According to CAA's sample survey, "Aircraft Use in 1948," there was a decrease in total private and non-scheduled flying time from 16,334,000 hours in 1947 to 15,130,000 hours in 1948. This loss occurred almost entirely in flight training.

CAA is still in the process of obtaining flight time for 1949, but considering the decrease in GI flight training applications, another large drop in training hours can be expected.

William T. Piper, president of Piper Aircraft, which is one of the few lightplane companies to have complete production figures available from the prewar years (see graph), has recently conceded that we are out of the training era. His company is typical of lightplane manufacturers in that it is swinging production from training aircraft to utility agricultural and 4-place cross-country planes.

Pilots, mechanics, etc., owned 4% of the aircraft and, outside the industry, the largest group of aircraft owners were the business proprietors, managers and officials who owned 21% of all private aircraft and had the highest aircraft utilization of owners not in aviation, 120 hours per plane. Farmers and farm managers owned 8,070 aircraft, the next largest number, and 101 hours each.

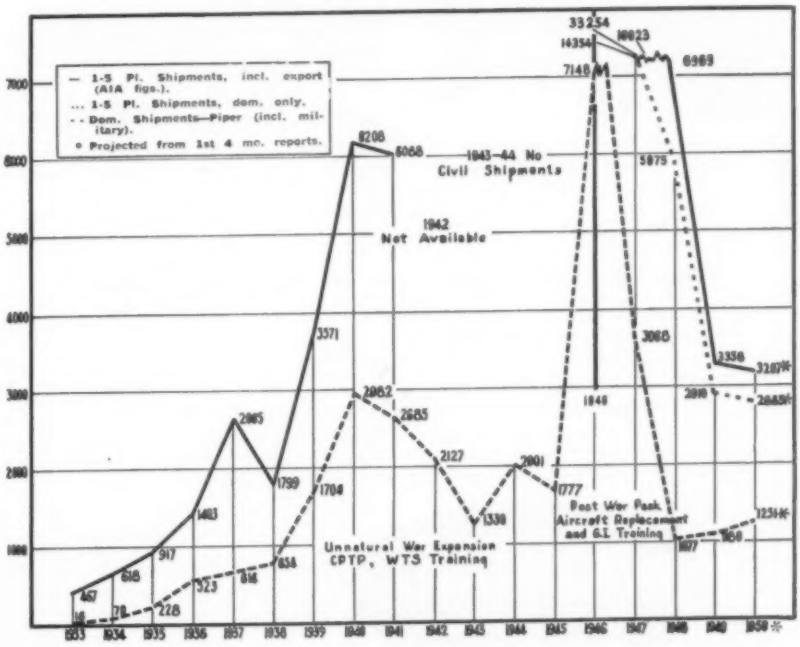
Largest Gain

The CAA category of business flying, which includes executive flying and flying by farmers on personal business, showed the largest gain 1947-1948 with a 31% gain in flight hours for the second successive year that business flying has shown the largest gain.

Transportation for hire was down about 2% and overall aircraft utilization dropped from 189 hours in 1947 to 169 hours in 1948.

Fliers Fly Little

Piper suggests that the future lies in developing a good rental business among licensed pilots. CAA figures show that we are training people to fly who then don't fly much: the 491,306 private and commercial pilots registered in 1948 averaged only 10½ hours each for the year on pleasure and business flying.



THIS GRAPH refutes the popular idea that lightplane production is "at the bottom of the barrel," if comparison is made between normal non-war years. Postwar lightplane production has steadied at a higher level if the years of abnormal wartime expansion and postwar GI training are disregarded. Piper Aircraft figures above include military shipments but otherwise illustrate the steady uptrend 1933-38 with domestic shipments picking up at a higher level in 1948 and continuing slowly up in 1949-1950.

Atom pile by-products "fly" to help medical research

Radioisotopes were needed by a Boston hospital for patient treatment. Lead-shielded box of radioactive iodine (weight, 35 lbs.) picked up by Air Express in Knoxville, Tenn., at 11 A.M., delivered 7:15 P.M. Charge, $8.60. Hospitals, like all business, use Air Express regularly to get supplies from anywhere in hours.

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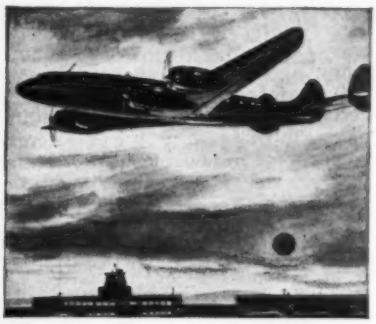

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LOCAL OPERATIONS

More can be done to provide daily, weekly and monthly flying rates as there are plenty of people who can use a plane for 50 or 100 hours, according to Piper.

Gap Needs Filling

Since fairly consistent growth has occurred since 1935 in every phase of private flying except flight training, the problem now is one of filling in the gap caused by decreased training.

Aerial star routes, which authorize the carrying of mail and cargo in lightplanes when surface transportation is not available, will help support some operators. The CAB decision that single engine aircraft may be used in feeder and local airline operations has resulted in inauguration of three such airlines on a test basis. But the prospect that shows the greatest immediate potential for the greatest number of operators is that of providing air taxi service from local airports to large airline terminals.

First Helioplanes Priced at $7-9,000

The first commercial model of the new 4-place Helioplane will be ready in August and should sell for between $7,000 and $9,000, Dr. Lynn L. Bollinger, chairman of the board of the Helio Aircraft Corp., Norwood, Mass., has announced.

The airplane will be built Aeronca Aircraft Corp. of Middletown, Ohio, but the Helio Aircraft Corp. will continue to conduct sales, engineering and research.

An unusual marketing procedure is being worked out which will offer to the purchaser a repair and maintenance service "guarantee" similar to that now used in the home television field. An owner will be relieved of all maintenance responsibilities except supplying gas and oil. His plane will have regular inspections, preventative maintenance, and free installation of factory-authorized improvements and modifications.

Sales at first will not be nationwide but confined to a few selected areas. A service organization for a given area will be set up before any Helioplane is made available to a purchaser in that area.

The Helioplane Four, an executive type, stall-proof and spin-proof, will be a full cantilever, highwing monoplane with all-metal wing and control surfaces. The fuselage will be steel tubing with fabric covering impregnated with a new flame-resistant dope. A 145-hp engine will supply power. The plane will fly or land at less than 30 mph but cruise as fast as conventional airplanes in that horsepower category.

For Local Operators

Air Taxi Openings

Fixed base operators interested in providing air taxi service between local airports and main airline terminals should get in touch with Joe Garside, National Air Taxi Conference president, at E. W. Wiggins Airways, Norwood, Mass. NATC plans to inaugurate air taxi operations throughout the country within the next month and is looking for qualified prospective members. Particularly needed in the mid-west, south and western states.

Fixed Base Operator Census

CAA's proposed census for fixed base operators is being held up while their regional representatives bring information on their Form 29A Airport Facilities Record up to date. This form gives information on the number of fixed base operators at airports and whether charter or flight instruction is available, but does not give the number of aircraft in such services or the extent of operations by hours. Whether there will be an overall complete census remains to be seen.

CAA Air Ambulance Directory

A directory of ambulance aircraft available in the United States, listed by state and city, is ready for the printers. It lists the names of air ambulance operators, the number of such aircraft available, the number of stretchers, whether there is room for a doctor, nurses, or additional passengers, and whether the plane carries oxygen. CAA hopes to put it in the hands of airport operators, medical societies and emergency organizations such as the Red Cross.

GI Affidavit

Affidavits for veterans who apply for flight training are at the printers now and should be available in Veterans Administration regional offices in a few weeks. There are two forms, one for the veteran to complete and one for completion by the "two competent disinterested persons" who must certify that flight training will be useful in earning his livelihood.

The Taft-Teague Bill on veterans training has been delayed way beyond original estimates but is due for consideration when the House completes its present work on the Appropriations Bill.

New Flashing Light Unit

NARCO, (National Aeronautical Corp.), Wings Field, Ambler, Pa., has developed a new flashing light unit for lightplanes which weighs in the ounces and will sell for about $9.95. The flasher does not cut out the light completely but goes from bright to dim, which decreases radio interference from current surge and gives longer battery, flasher and lamp life. In addition, a filter has been developed for aircraft which need it. CAA has one of the units and is running it through flight tests with other units to determine if satisfactory equipment exists to justify requiring flashing lights on night-flying lightplanes.

Refueling Danger

Normally, during refueling of aircraft, four grounding wires are used: aircraft to ground, aircraft to fuel tender, fuel tender to ground and nozzle to wing tank. However, the following experience of the RCAF Winter Experimental Station indicates that it may also be a good idea to ground the person.

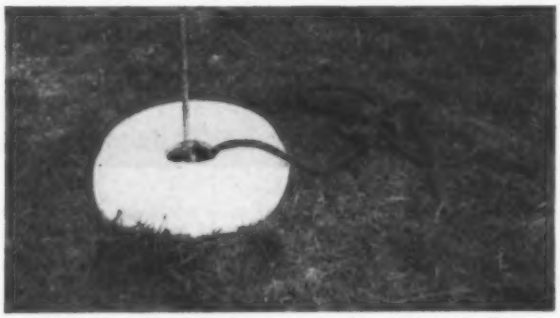
"The airman put the nozzle into the tank, the gas started to come through and after about three seconds an explosion occurred. The airman was burned and blown off the wing and the aircraft caught fire. Due to shock and burns, he remembers nothing. It was snowing heavily at the time and the nozzle connecting wire was never found. The cause of the static discharge may have come from the airman himself, who had been walking about the wing clearing off the snow with his rubber boots on."

It is true that friction of clothes and movements could have built up electricity on the man, insulated from the wing by his boots. However, if he had touched the fuel nozzle to the aircraft before removing the gas tank cap, the charge would have been dispersed; the hose handle and nozzle are one metal part and act as conductors. But again, the nozzle must remain in contact with the aircraft while filling the tank or a static build-up may occur.

The problem has been considered in other fields. In some industries, shops are provided with conductive floors and employes wear conductive shoes. One manufacturer makes a personal static ground to be worn on the foot. Recommendations on "Fire Hazards of Static Electricity in Airport Operations" will come up for final adoption at the National Fire Prevention Association's annual meeting this month.

Tie-Down Indicator

A used tire, slashed in half and painted white, can be used to mark tie-down stakes so that pilots taxiing in at night or transient pilots landing for the first time at



an airport can see where to park. Howard Graves, manager of Cub Haven Airport, Lock Haven, Pa., picked up the idea at an Elmira, N. Y., airport. If a plane rolls over the tire, it mushes down and then springs back in place.

Among the Operators

Red Skelton of Jamestown, Pa., has instituted an Old Folks Day at the airport, with free rides . . . **Bevo Howard**, former National Aviation Trades Association president and head of **Hawthorne Flying Service**, Charleston, S. C., is in France competing against Europe's top aerobatic pilots. His Bucker Jungmeister was crated for its second Atlantic crossing by ship. After completing the tour, Bevo will go to Pakistan to follow up on progress of the Royal Pakistan Air Force cadets who graduated last December from the Hawthorne Jacksonville base . . . **J. H. Lapham**, operator of the **Flying L Ranch**, Bandera, Texas, operates a dude ranch airport for transient pilots and week-end flyers. Corporation pilots like it because the ranch is on the airport and there is no taxi ride to town. Food grown on the ranch helps out in the Pilots Lounge dining room, but the main income depends on the airport and guest cottages. The ranch has complete airport facilities, B-24 size runways, a swimming pool, and the wild west . . . **Ray Mack** of **Plaza Airport**, Charlotte, N. C., ran a newspaper add, "Fly for a Dollar," and got good response. He uses Cubs, flown by commercial pilots who are eager to fly on Sundays to pick up the flying time. The children make good prospects, and Mack says, "At a buck a throw, not many parents will turn them down." He's working on that 95% of the population that never have flown.

—B. J. Ward

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CUTTING TOOLS: The Continental Tool Works, a division of Ex-Cell-O Corp., Detroit, has available a 136-page fully illustrated tool catalog listing and describing all Continental standard cutting tools. Also contains useful information and charts used by the metalworking industries. Catalog 60681.

SOIL PATTERNS: The U. S. Department of Commerce, CAA, has published Technical Development Report 85, "Airphoto Patterns of Soils of the Western United States," as applicable to airport engineering. The 76-page book supplements an earlier publication "The Origin, Distribution and Airphoto Identification of U. S. Soils." It describes one phase of an investigation conducted for the Airport Development Div., Technical Development, CAA, by the Joint Highway Research Project, Engineering Experiment Station, Purdue University. On sale by the Supt. of Documents, U. S. Government Printing Office, Washington 25, D. C.

INSULATING VARNISHES: New York University College of Engineering, New York 53, N. Y., has published a 12-page booklet titled "Practical Factors in Applying Insulating Varnishes." Covers the subject of electrical insulating varnishes. Price: 25c.

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UNITED AIR LINES

WINGS OF YESTERDAY

25 Years Ago

Major R. W. Schroeder, vice president of the National Aeronautic Association, and B. Russell Shaw, who for three years was executive vice chairman of the contest committee of the NAA, took up their duties on May 15, 1925, with the new commercial Ford Airlines and the Stout Metal Airplane Co. of Detroit, Mich., with Schroeder as superintendent of flying operations and Shaw in charge of ground organization.

●

The Danish Government arranged a merger of the two air transport companies of that country, the Danske Luftfartselskab A.S., and a new company formed with the aid of German airplane manufacturing interests. The company was to be known as the Danske Luftfartselskab.

●

Orville Wright announced his intention to send his first plane of 1903 to the Science Museum at South Kensington, London.

10 Years Ago

(In AMERICAN AVIATION)

The House defeated the President's Reorganization Order No. 4 by a majority of 232 to 153. The plan, to abolish the independent status of the Civil Aeronautics Authority, had not yet come up for Senate vote.

●

Charles P. Graddick, superintendent of air mail for the U. S. Post Office Department since 1934, tendered his resignation and was to join United Air Lines as director of mail and express.

●

National Airlines filed application for a 1,405-mile route between New York and Havana, Cuba.

LETTERS

Slopeline System

To the Editor:

The article "Who Owns the Slope Line System" appearing on page 17 of the May 1, 1950 issue of AMERICAN AVIATION, would appear to create the impression that I was successful in patenting that which has been credited to Cory Pearson and the late Jerry Swan, namely, the Slopeline Approach Light System. Such is not the case as the following facts will prove.

My invention was made as an improvement on the Slopeline System and any other approach lighting system consisting of a number of spaced-apart rows of approach lights. The improvement comprises the addition of a plurality of transverse light bars which are so correlated with the Slopeline or other approach light system as to afford longitudinal distance indication as well as roll and bank guidance for approaching aircraft. The Patent Office, in examining my application, which was based on this improvement, referred to the Slopeline System but recognized that my invention was patentably distinct therefrom and granted me patent No. 2,501,504 on March 21, 1950.

Thus far, my improvement has brought the weather minima down for Southwest Airways at Arcata from a ceiling of 200 feet, and a visibility of one-half mile, to a ceiling of 100 feet and a visibility of one-quarter mile. (For specific mention thereof please refer to CAA Operation's Specification, Form 511C for Arcata-Eureka, California). The improvement has also made possible the abandonment of FIDO, heretofore in use at the Arcata-Eureka Airport.

I would also like to add that when the invention was made, I was under contract as a consultant to Transocean Air Lines, the LAES contractor. My contract did not provide for any developmental work. In fact no development or research work was carried out or even permitted at the station by the U. S. Government. Hence it is clear that my system was *not developed* under any government project but was submitted by me for comparative testing along with other approach light systems, some of which were and some of which were not owned by the Government. My consultative contract ended before the final evaluation of my system was undertaken.

MAURICE A. GARBELL

(Editor's Note—Our thanks to Dr. Garbell for straightening out the matter and correcting the impression in our news story that he had patented the slope line system. The basic system can't be patented.)

Air Transport Progress Issue

To the Editor:

The April 15th issue of *American Aviation* is the finest job of its kind I have ever seen, and you are to be congratulated for your initiative in making it available to the industry, particularly to those of us in the field who do not always have access to much of the information contained therein.

Incidentally, this issue saved my life the other night when I was asked on an hour's notice to make a short speech to a group of hotel men. I accepted with alacrity, of course, and then tried to figure out what I was going to talk to them about.

I got my theme from the "Domestic Airline Percentage of First-Class Travel Market" table on page 6 *"Facts and Figures"*; namely, that the airline percentage of the first class travel market has increased from 12.36% in 1940 to 41.63% in 1949, that it would continue to increase, and that the more it increases the more business it means for hotels.

RALPH J. HEININGER
District Traffic & Sales Manager
Continental Air Lines, Inc.
Kanas City, Mo.

To the Editor:

Congratulations on the wonderful job you and your staff did with the April 15 Air Transport Progress issue.

It is obvious that a great deal of work went into this review of the industry, and I am sure that it will be a valuable reference book during the entire year.

JAMES H. COBB, JR.
Delta Air Lines, Inc.

To the Editor:

Congratulations on the monumental work you have accomplished in your Air Transport Progress issue of April 15. This compilation of facts and figures will certainly prove an invaluable guide to the industry.

Unfortunately, in tabulating the ton-miles of mail carried by Wisconsin Central for the year 1949, the figures were apparently confused with West Coast Airlines. As a result we were placed thirty-second on the list, whereas the records show that we should be twenty-eighth on the list.

FRANCIS M. HIGGINS, President
Wisconsin Central Airlines, Inc.

(Editor's Note: The transposition of mail

What Price Quality?

SINCE 1923—Aviation people have associated Frank Ambrose Aviation Co. with quality and dependability. They know that whether or not it is an item of minute size costing but one cent, or a giant sized engine—Ambrose can supply it! They know too that Ambrose has set standards upon which maintenance personnel have come to depend and measure by!

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ton-mile figures of Wisconsin Central Airlines and West Coast Airlines was our tabulator's error. Wisconsin Central should have been 28th on the list instead of 32nd.)

Top Airline Pilots

To the Editor:

The selection of our Captain Orville Handy as one of the nation's ten top airline pilots is appreciated.

We felt Captain Handy did a fine piece of work on the March of Dimes tour, and certainly appreciate this acknowledgement of his efforts on this worthy project.

EARL F. SLICK, President
Slick Airways, Inc.

To the Editor:

We all were pleased here on receiving your announcement that Capts. O'Neal and Wright were amongst the outstanding ten pilots in 1949. As you know, we are very proud of our captains, and we require of them the quality and command decision in addition to the skills of airmanship.

Your project in designating ten captains annually who have made genuinely constructive contributions to the progress of the industry should be an incentive to air transport progress.

WILLIS PLAYER
Pan American World Airways System
Public Relations

Air World Education

To the Editor:

A comment, rather than a rebuttal, on the front page editorial "Cosmic Kidoodle" of the March 15 issue which seemed to meet disfavor, judging by the number of copies I saw marked "I don't like this, but . . .".

Allow an ex-school-marm-air-hostess who flew back from Paris to attend the Atlantic City conference, and probably knows less than you about what went on, but has her heart in education even if her head is in the clouds, to comment:

I feel that both aviation and education need some people like myself—who are out of their field—to break down prejudice, clean out waste, and coordinate objectives in a changing aviation world. Perhaps the National Council on Aviation Education can at least expose specialists from the different fields to each other until some of their common "issues and purposes" can be established by mutual understanding of aims, needs, and operations. Educators are trying to come out of the cloisters where they have been locked up writing textbooks to look into the needs of an *Aviation Age*. Industry and government have squandered millions in "give-away" material without giving in terms of the learning process, or hitting the vast untapped revenue from *air world consciousness*—and that doesn't even *sound* like a commercial.

If we throw some sincere industrialists into education, bent on learning what they can offer, and let some educators into industry to show them how to offer it, we can sit back and watch the mutual benefits from breakdown of prejudice, appreciation of needs, and understanding of procedures. It's subtle, but no more far-fetched than 90% of the industrial "public relations" carried on today. Perhaps the council can do this, and thus define for both sides, the "aims and purposes" they should be working for.

The industry could well wake up to the fact that it has new responsibilities. Aviation has been introduced, and war production completed. Most of us know all we need to know about distinguishing ailerons from stabilizers, but do we know the importance of aviation in a global world? It's time to stop production of expensive, outmoded airplane manuals, and offer air world thinking, with the airplane as the axis of a new world of expansion and opportunity. Perhaps the new Council can do this. Perhaps it can set up a program for an educational and industrial, not to mention federal and social, problem that has become global, rather than merely vocational and locally interesting. If the sale of airplanes for private use has diminished, how about the increase in commercial craft for global enterprise and travel? How about the market for aviation equipment in previously inaccessible territories? Is anyone going to present aviation industries some place—geography and first hand knowledge about these places.

Do these potentialities not justify some exchange of ideas with education—a setting up of commonly understood issues, rather than sending educators back to write more textbooks about something they don't understand, while students play with costly outdated "aviation projects" now available—old fashioned "busy work" wasting precious school hours and sponsors' cash?

Aviation for national defense is now much less of an issue than *air world education for international security of peace and goodwill*. Here again the Council has a very definite problem. If they don't know it, we should be telling them rather than trying to break up an effort at coordination between the floundering separate institutions of education, government, industry and labor. There is economy for all in "allied service." Let education departments from different fields combine to profit by understanding of educational techniques. Let educators work with enterprises to clarify their programs in terms of *air world ideals and utility*.

Not *aviation jobs* now, Mr. Parrish, but *air world jobs*, with their tremendous importance to aviation! If aviation industries can't sell more to the world, than to local outlets, then they are slipping—and perhaps more air world education is needed within aviation itself.

A need was felt. A council has been formed to define that need and reject outworn approaches to something that no longer exists. At least something of the sort should be the aims of a National Aviation Education Council. Sure they aren't clearly defined any more than were CAA's when they "overstaffed the convention with recorders" (but there was also advisory personnel briefed in how to make an effective contribution to an education conference). Maybe the Council can point out the mysteries that these fields—education, labor, industry, and government have in common.

Give some of the teachers a ride and let them go back to talk intelligently about the force of aviation in a world, two-thirds of which has just been opened by the airplane for enterprise—and I don't mean a ride around the local airport. Aviation education can suffer as aviation enterprise is suffering by misplaced emphasis. Production is no longer the issue. Even as we must break down international prejudices, we must break down the barriers of closed doors between our own enterprises—federal, industrial, educational. "You gotta give to git," and if you give enough, with enough understanding of educational needs, you won't be grudged your profit.

It's time to stop waste—I'll go along with that, Mr. Parrish. Maybe next year the National Aviation Education Council can offer some sound advice on how to coordinate what the educator knows about the learning process with what is wanted by the enterprises for which the child is being trained in an *air world*—simply, frugally, and effectively.

AMY R. BALLAGH
(Air Hostess, International)
Flushing, N. Y.

(Editor's Note: Thanks to Stewardess Ballagh for a thoughtful and constructive rejoinder. There is no disagreement with need for sound educational program, but the Atlantic City conference didn't seem the way to this editor or to majority of industry people attending to obtain it.)

OBITUARY

Frank A. Tichenor

Frank A. Tichenor, editor and publisher of *Aero Digest*, died May 4 at his home in Greenwich, Conn. He would have been 70 on May 22. Born in Gesthamane, Ky., and graduated from Villanova, Tichenor established *Aero Digest* in 1922. For a time up until the war he published *The Sportsman Pilot* and for many years he has also published *Revista Aerea* for Latin America. He had long been a leading figure in aviation and had been a champion for the Air Corps in the 20's and the 30's. Surviving are his widow, Mrs. Jessie Horsfall Tichenor; a son, Frank A. Tichenor, Jr., two grandsons of Darien, Conn., and a sister.

M. S. Biedenharn

M. S. Biedenharn, vice president and a director of Delta Air Lines, died of a heart attack in Louisiana in late April.

BOOKS

INTERNAL AUDITING IN INDUSTRY, edited by Victor Z. Brink and Bradford Cadmus, published by Institute of Internal Auditors, 120 Wall St., New York 5, N. Y. $5.00.

Concerned with the special and unusual requirements and internal control and internal auditing problems of a number of representative industries, this book contains a chapter on the air transport industry.

IN FLIGHT

A PAGE FOR ALL PILOTS

Condition Not Age

A REPORT in the *New York Times* recently discussed TWA's experience with pilots who are getting along in years. Dr. Harold Dye, director of medical services of TWA, indicated that no TWA pilot was ever grounded because of age. The physical condition of the individual, not a given age, will apparently be the deciding point in limiting pilot service.

It was interesting to note that Dye felt that hearing in the cockpit and not ability to pass a given isolated hearing test, was the best way to judge a pilot's ability to carry on related phases of his work. Dye noted that pilots who showed impaired hearing during physical checks often did not carry this over into the cockpit. He attributed this to their hearing becoming attuned to the steady noises and then functioning normally.

One pilot of his acquaintance, Dye said, used trifocal lenses in his glasses. The upper section was used for distance vision straight ahead, the middle section served in reading instruments on the panel and the lower section for reading maps and similar uses.

The TWA medical director stated that the industry is too young to have established an arbitrary retirement age for pilots and noted that it might be possible to use elderly pilots, after their reaction times are below youthful standards, in charge of the flight but with the more active duties delegated to other crew members.

25-Year Man

Warren Vine, a Captain with American Airlines, is the first American Airlines employee to complete 25 years service with the company. He started with AA on May 1, 1925 when he was employed by the man who later founded Embry-Riddle Aviation Corp., an AA predecessor. Several years later Vine became a pilot for the company and he has been employed in this status ever since.

Vine

Lightplane GCA Runs

Advice for lightplane pilots who may someday need to land in instrument weather under GCA control comes from Arthur B. Marsh of Summit, N. J. Marsh flies about 350 hours yearly in his work as sales manager of an aviation finishes company and recently decided it would be good life insurance to investigate GCA. Saturday afternoons, he has been flying his Swift to LaGuardia Field and says the GCA controllers there are only too willing to grant practice GCA runs if you give advance notice.

He takes another pilot along, and uses an orange polaroid windshield screen and blue polaroid goggles. Aircraft equipment consists of full flight instruments, VHF and low-frequency radio, a surplus marker beacon receiver to give position checks on final approach, and a separate battery-operated Lear Avion radio in case of failure of the rest of the equipment.

Marsh had assumed that his Swift, being an all-metal aircraft, would give a strong radar screen image but soon found out that it is the total amount of surface perpendicular to the radar impulses that governs the radar reading. Flaps down on final gives a much better target reading and the controllers have discovered that a metal prop on an all-fabric plane gives a better radar target than the Swift does with its wood and plastic propeller.

The amount of crosswind on the GCA runway is an important factor with a lightplane, since radar reflection is poor when the plane is crabbed. For the best practice runs in a plane having an approach speed of 80-100 mph, the wind should not be more than 30 degrees off the GCA runway.

The first radar contact is made within a ten-mile radius of the field, and the controller gives instructions to fly a heading and then make a 90° turn until he has identified the aircraft. Instructions are given to put the plane on a long base leg and, before turning on final, the cockpit check is carried out and flaps lowered. On one approach, Marsh's transmitter failed due to a break in the microphone plug. The controller asked for a 90° right turn to determine if his receiver still worked, followed by a 270° turn to bring him back on course. They brought the Swift down the runway center line to 90 feet as easily as in an approach with normal radio communication.

Marsh has made about 20 practice GCA runs in his Swift, frequently down to 50 feet, and all but one brought him within the lateral confines of the runway. That once, he was ordered to pull up and go around, apparently due to a crosswind and a high crab angle. He says he has developed complete confidence in the system. "By all means try it."

Lightplane Altitude Mark

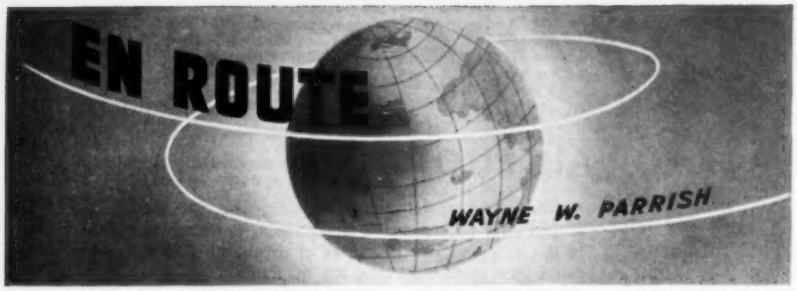
A new lightplane international altitude record of 24,504 feet was set March 31 by Ana Louisa Branger of the Venezuelan Embassy in Washington, D. C. National Aeronautic Association has announced the record is official and has forwarded a request to the Federation Aeronautique International that the international record be recognized for the aircraft class between 1104.5 and 2204.5 pounds. Mrs. Branger made the flight in a Piper Cub Special powered by a Continental C-90-8F engine and equipped with a specially designed McCauley fixed low-pitch propeller. The flight took a total of 2½ hours.

Are Pilots on the Way Out?

We keep hearing every few months some expert asserting that pilots are becoming redundant in the airplane of the future. Sometimes these statements are accompanied by warning of a definite time and sometimes it is a general statement about the future.

Dealing first with the military pilot it is fortunate that the chiefs of staff know quite well that the electronic missile can be made formidable but is not being a thinking agency. An attack with such equipment can be killed stone dead if the enemy has a slightly superior piece of electronics. But if you give a stout hearted pilot just a bare chance of escape he will go in against fearful odds, make a strike and bring his equipment back to fight again.

So long as a pilot (or "supervisory being" shall we call him) is in command of the weapon then the enemy is always up against an irrational attacker. The use of rational defensive measures can never therefore be a guarantee against penetration. Electronic brains can do calculus, and "remember" things and act with cold precision and mathematically choose the safest method of attack. But the human brain has all these qualities plus the intangible element of sheer courage and innate cunning which can produce some unusual tactics and can never be wholly resisted by electronics.



Against Advice. I've been warned by my mentor **Bert Holloway** of Lockheed that I may alienate some of my readers by diverting from travelogues to such solemn subjects as cathedrals. But it won't be the first time that I've stuck my neck out and flaunted perfectly sound advice. Anyway, this little piece on cathedrals can be blamed on TWA because they took me to Madrid a few months ago and all of my latent enthusiasms about those enchanting musty old Spanish cathedrals came to the surface.

Most churches leave me cold, but not the grand edifices of England, France and Spain—and especially Spain. I've seen only one cathedral in the western hemisphere—Mexico City—which seemed to carry some of the majesty and greatness of the medieval cathedrals into the new world.

It was twenty years ago that I made the rounds of the Spanish cathedrals but

Eating tangerines and wondering . . .

even today each one is a vivid memory—Burgos, Leon, Salamanca, Segovia, Avila, Seville, Granada, Tarragona, Toledo, Cordova and Gerona, to name some of the best. It was my re-visit to Toledo recently that stirred my memories.

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They're Different. I suppose the one thing that first challenged me about a medieval cathedral was the magnitude of the structure. No steel, no cement, no modern building methods, and yet these buildings were constructed for eternity. Not in a few years or even one generation, but most of them required several hundred years to complete. I used to sit on a wall or a bench near one of these buildings, peeling and eating tangerines by the dozen, wondering just what it was that drove those people hundreds of years ago to undertake such colossal construction and continue it for a period of time far longer than our own country has been in existence.

There are two things about Spanish cathedrals that make them different from all others. One is the darkness of the interiors. The sun beats down pretty heavily on arid Spain and as a consequence the architects made the windows quite narrow. Entering from the bright sunlight requires some minutes for eye adjustment inside. They're all quite cool even on the hottest days, and very cold in winter. They are really quite mystic, or religious if you prefer, as the light shining through the ancient stained glass windows produces a soft dim hue over the countless sculptures and interior adornment.

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No Seats. Another thing, the Spanish cathedrals are not for the masses. They are essentially for the priests. There are no seats or no general area for public worship. There may be small groups of chairs here and there, especially in or near chapels, but the worshipper is supposed to go to a church to worship, not to the cathedral.

In the huge nave where seats would normally be found there is a big priests' choir, with high walls on three sides, so when you enter a Spanish cathedral from the main west end (never from the main doors because these are open at rare intervals), you don't get the usual sweeping view of the interior. The view is blocked solidly by the priests' choir which, incidentally, is usually outfitted with magnificent woodwork, carvings and other adornment. The clergy hold services many times a day without the slightest concern whether anybody else is around.

My introduction to Spanish cathedrals was in late February of 1930. I had sat all day on a hard wooden seat in an ancient third class coach from the

. . . all day on a wooden seat.

French border and reached Burgos late in the afternoon. It was quite cold and the treeless, barren plateau of northern Spain was anything but hospitable. But the beret-wearing Basques earlier in the day had been very friendly and shared their chicken and wine with me.

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Burgos is Tops. As we reached Burgos I saw the cathedral towering over the town of 30,000 and it was with great anticipation that I walked to it early the next morning. Burgos was founded in 884 and was the first capital of Old Castile. It had been one of the great cities of old Spain. The cathedral was founded in 1221 but had taken almost 350 years to complete.

Here in this little town far off the beaten track was the most beautiful structure I had ever seen—and I have yet to see anything better. The stonework, the traceries, the majestic interior views, the sculptures, the stained glass, the wood carvings, the resplendent altar, and, above all, the magnificent octagon reaching high into the sky over the crossing, were all breathtaking. When I had reached the central crossing and looked up into the octagon surmounting the transept, tears came into

. . . dark, cool cathedrals.

my eyes for the one and only time as the result of the beauty of architecture. No Two Alike.

I spent most of the day soaking in the beauties of Burgos Cathedral. Centuries of time had gone into its building. Not one architect, but many. Thousands of workmen had given their time and labor. Built for eternity, yet as delicate as lace. Quite apart from any religious aspect, here was a man-made structure designed to worship the deity which could not help but impart awe if not reverence.

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No Two Alike. No two cathedrals in Spain are alike. Not one is pure Gothic, or pure Romanesque, or pure Rennaissance. There's a little of the French, the English, the Dutch and the Italian, in all of them. The cathedral in Seville is the largest Gothic church in the world, the one in Cordova was once a mosque, while the dark, musty cathedral of Avila forms a part of the wall surrounding the town so that it could be used as a fortress when and if needed.

Maybe I'm just dreaming, but I'd like again to make the rounds and sit on a bench peeling tangerines and pondering the inner motivations of the people who build those magnificent structures.

(Next issue I'll tell you about visiting Franco.)

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Haircuts. A haircut is a pretty simple operation but it's surprising how some peoples of the world can butcher it up. I've often wondered how men like **Sam Irwin** of Curtiss-Wright and some of the other perpetually-travelling aviation salesmen manage to keep any hair at all. I've been in some pretty weird barber shops from Nairobi to Shanghai but the worst of all, by a wide margin, was in the Avila Hotel at Caracas, Venezuela. Having the men's shop in the midst of a beauty parlor was bad enough but the barbers down there cut the hair with a straight edge razor. What little hair I had hasn't grown back yet. Don't say I didn't warn you, it's a hair-raising experience.

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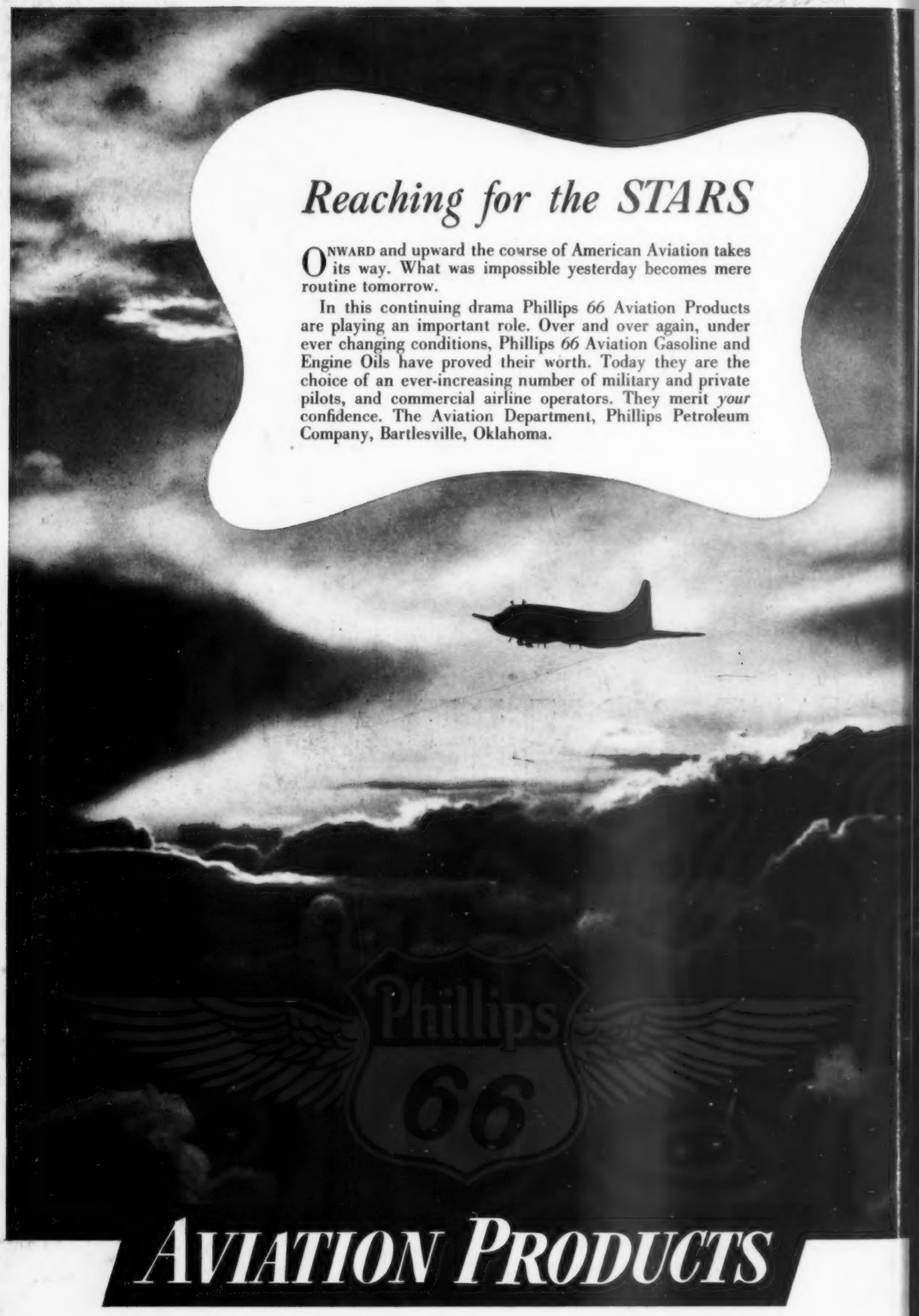
Reaching for the STARS
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